CONSERVATION CROP ROTATION

PRACTICE INTRODUCTION

USDA, Natural Resources Conservation Service - practice code 328

CONSERVATION CROP ROTATION

This practice means growing various crops on the same piece of land in a planned sequence. This sequence may involve growing high residue producing crops such as corn or wheat in rotation with low residue producing crops such as vegetables or soybeans. The rotation may also involve growing forage crops in rotation with various field crops.

PRACTICE INFORMATION

The effects crop rotation have on the land varies with the soil type, crops produced, farming operations, and how the crop residue in managed. The most effective crops for soil improvement are fibrous rooted high residue producing crops such as grass and small grain. Perennial plants used for forage are very effective in crop rotations due to increases in organic matter and reduced soil erosion. In addition, crop rotations help break insect, disease and weed cycles.

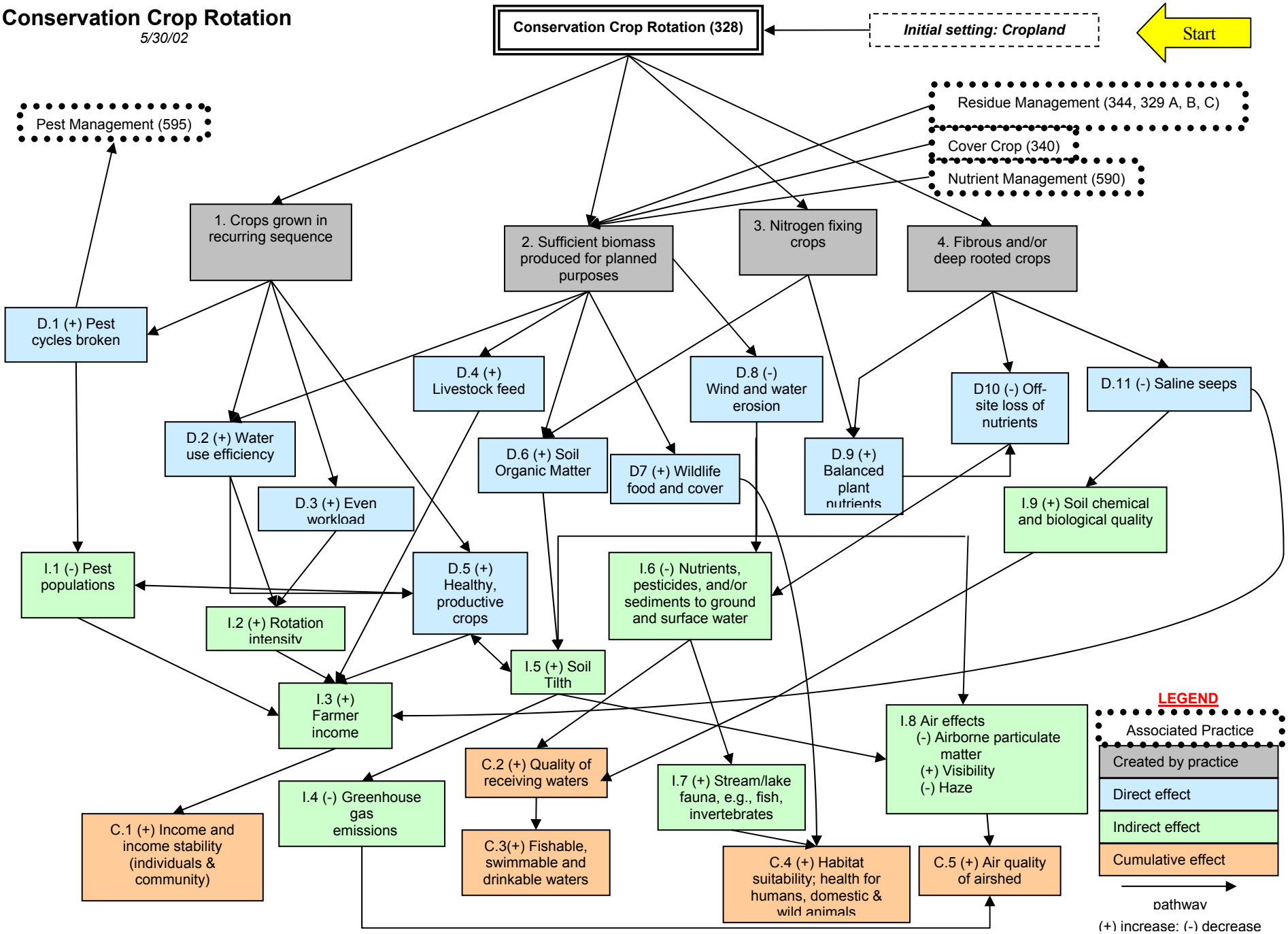
Rotations add diversity to farm operations and often reduce economic and environmental risks. Crop rotation is a low cost practice that often forms the basis for other conservation practices. Practices such as residue management, contouring, stripcropping, diversions, terraces and grassed waterways may not function properly without a planned crop rotation. Major benefits include:

1. Reduced runoff and erosion
2. Increased organic matter
3. Improved soil tilth
4. Improved pest management
5. Better moisture efficiency
6. Higher yields
7. Improved aesthetics and wildlife habitat

The following page identifies the effects expected to occur when this practice is applied. These effects are subjective and somewhat dependent on variables such as climate, terrain, soil, etc. Users are cautioned that these effects are estimates that may or may not apply to a specific site.

Conservation Crop Rotation

5/30/02



CONTOUR BUFFER STRIPS

PRACTICE INTRODUCTION

USDA, Natural Resources Conservation Service - practice code 332

CONTOUR BUFFER STRIPS
Contour buffer strips are strips of perennial grass alternated with wider cultivated strips that are farmed on the contour.

PRACTICE INFORMATION
The benefits of farming on the contour with the added protection from the grass strips make contour buffer strips an effective and cost efficient conservation practice.

Contour buffer strips slow runoff water and trap sediment. Consequently, soil erosion is general reduced significantly by this practice. Sediments, nutrients, pesticides, and other potential pollutants are filtered out as water flows through the grass strips. The grass strips also provide food and cover for wildlife.

The practice is not well suited for undulating terrain with steep irregular slopes where contouring is impractical.

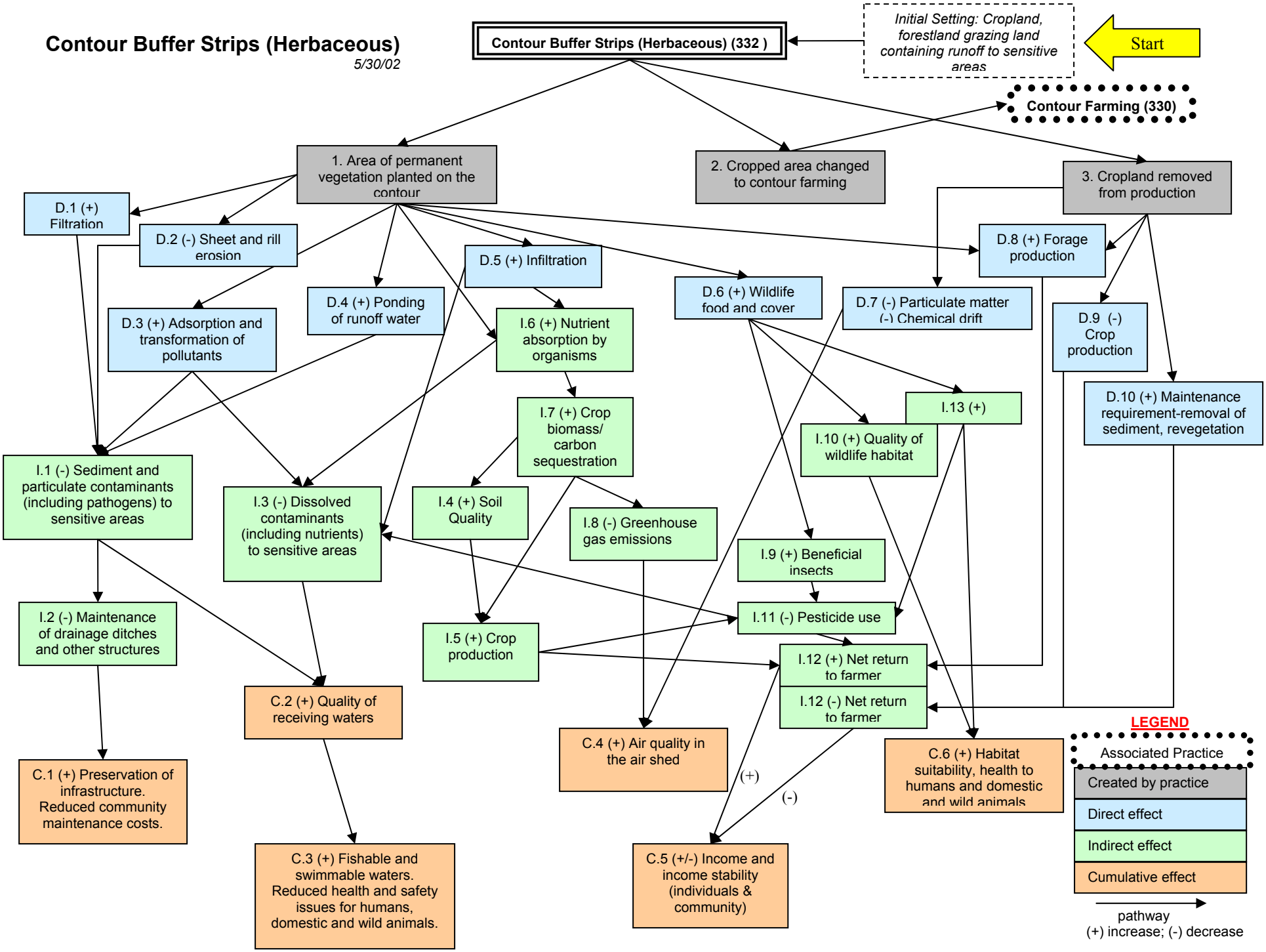
The effectiveness of contour buffer strips is dependent on several variables such as steepness, soil type, crops grown, strip widths, management, and climatic factors.

Standards and specifications containing minimum requirements, including maintenance, are included in the USDA/NRCS Field Office Technical Guide.

The following page identifies the conservation effects expected to occur when this practice is applied. These effects are subjective and somewhat dependent on variables such as climate, terrain, soil, etc. Users are cautioned that these effects are estimates that may or may not apply to a specific site.

Contour Buffer Strips (Herbaceous)

5/30/02



COVER CROP

PRACTICE INTRODUCTION

USDA, Natural Resources Conservation Service - practice code 340

COVER CROP
Growing a crop of grass, small grain or legumes primarily for seasonal protection and soil improvement.

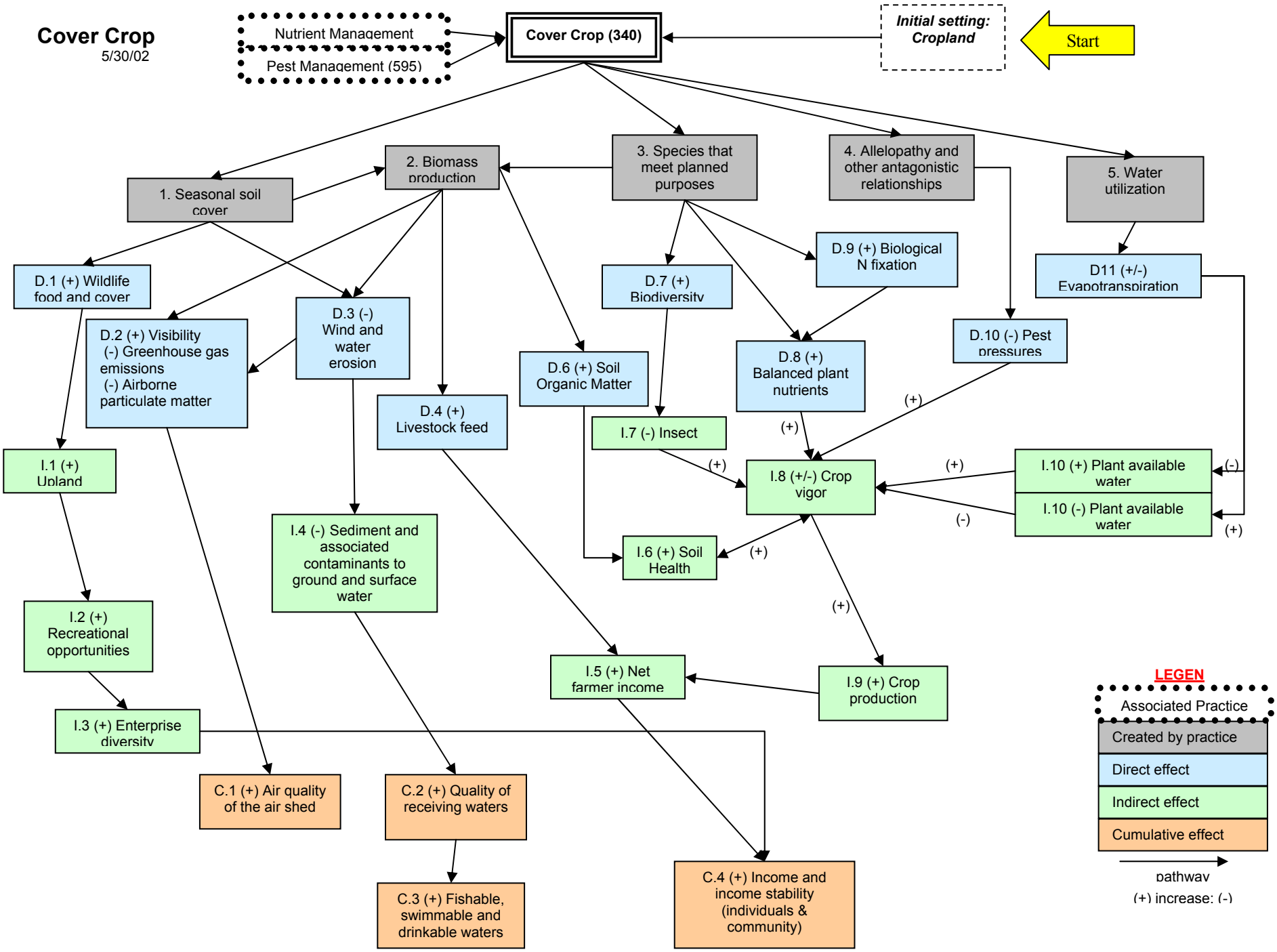
PRACTICE INFORMATION
Cover and green manure crops are grown on cropland, orchards, vineyards, and certain recreation and wildlife areas where seasonal benefits of a cover crop are needed. These crops are usually plowed under or desiccated to accommodate the primary crop being produced on the site.

This practice is used to control erosion, add fertility and organic material to the soil, improve soil tilth, and increase infiltration and aeration of the soil. In orchards, this practice is also used to increase populations of bees for pollination purposes.

In addition, cover and green manure crops have beneficial effects on water quantity and quality. Cover crops have a filtering effect on movement of sediment, pathogens, and dissolved and sediment-attached pollutants.

Additional information including standards and specifications for establishment and management of this practice are on file in the local NRCS Field Office Technical Guide.

The following page identifies the conservation effects expected to occur when this practice is applied. These effects are subjective and somewhat dependent on variables such as climate, terrain, soil, etc. Users are cautioned that these effects are estimates that may or may not apply to a specific site.


Cover Crop
5/30/02
Nutrient Management
Pest Management (595)
Cover Crop (340)
Initial setting: Cropland
Start
1. Seasonal soil cover
2. Biomass production
3. Species that meet planned purposes
4. Allelopathy and other antagonistic relationships
5. Water utilization
D.1 (+) Wildlife food and cover
D.2 (+) Visibility
(-) Greenhouse gas emissions
(-) Airborne particulate matter
D.3 (-) Wind and water erosion
D.4 (+) Livestock feed
D.6 (+) Soil Organic Matter
D.7 (+) Biodiversity
D.8 (+) Balanced plant nutrients
D.9 (+) Biological N fixation
D.10 (-) Pest pressures
D11 (+/-) Evapotranspiration
I.1 (+) Upland
I.2 (+) Recreational opportunities
I.3 (+) Enterprise diversity
I.4 (-) Sediment and associated contaminants to ground and surface water
I.5 (+) Net farmer income
I.6 (+) Soil Health
I.7 (-) Insect
I.8 (+/-) Crop vigor
I.9 (+) Crop production
I.10 (+) Plant available water
I.10 (-) Plant available water
C.1 (+) Air quality of the air shed
C.2 (+) Quality of receiving waters
C.3 (+) Fishable, swimmable and drinkable waters
C.4 (+) Income and income stability (individuals & community)
(+)
(-)
LEGEN
Associated Practice
Created by practice
Direct effect
Indirect effect
Cumulative effect
pathway
(+) increase: (-)

FENCE

PRACTICE INTRODUCTION

USDA, Natural Resources Conservation Service - practice code 382

FENCE
A fence is a constructed barrier to livestock, wildlife, or people.

PRACTICE INFORMATION
This practice may be applied to any area where livestock and /or wildlife control is needed, or where access to people is to be regulated.

A wide variety of types of fencing has developed. However, fencing material and construction quality is always designed and installed to assure the fence will meet the intended purpose and longevity requirements of the project.

The standard fence is constructed of either barbed or smooth wire suspended by posts with support structures. Other types include woven wire for small animals, electric fence as a cost efficient alternative, and suspension fences which are designed with heavy but widely spaced posts and support structures. Designs for most types of fences are available at the local NRCS field office.

Things to consider when planning a fence include the following:

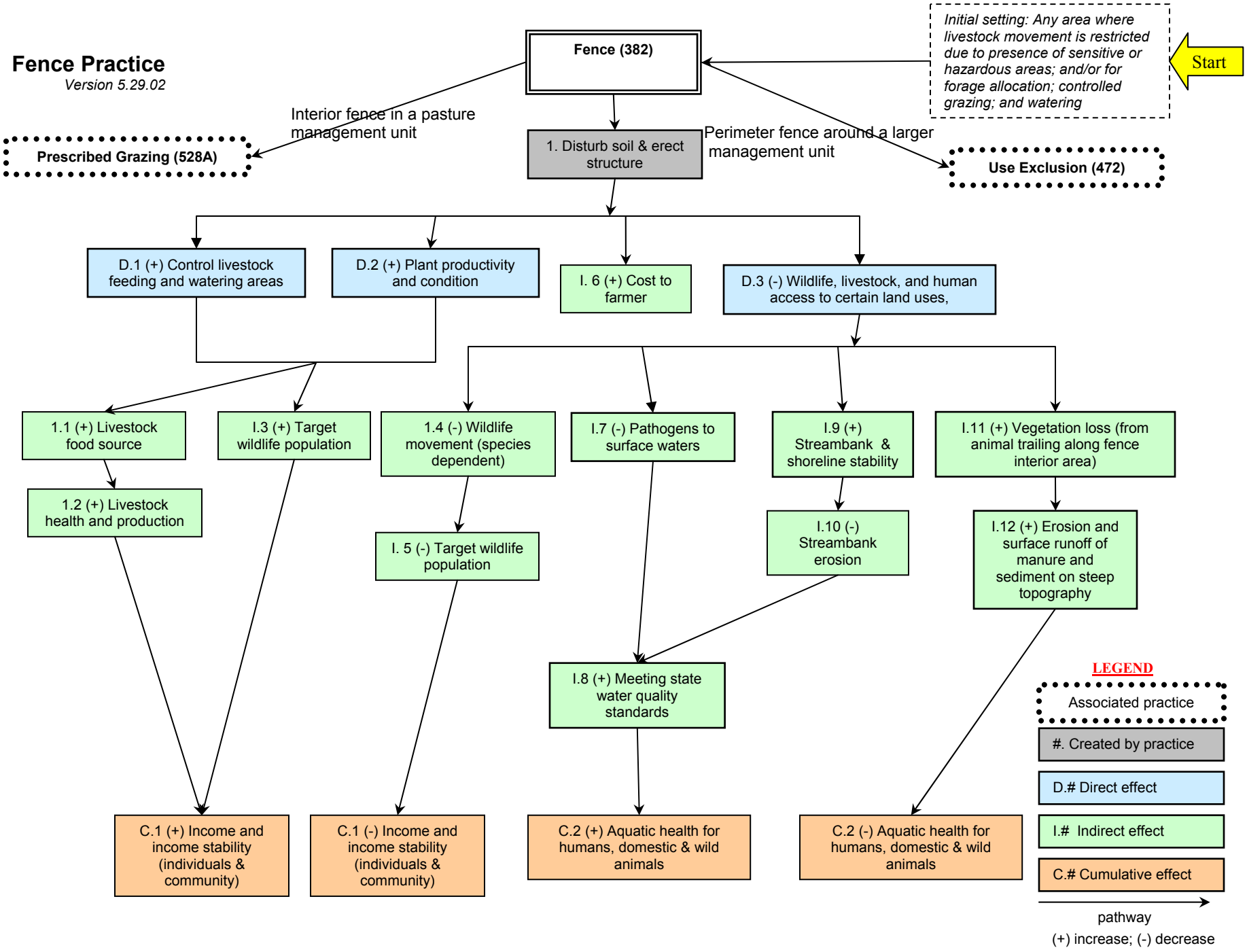
1. For ease of maintenance purposes avoid as much irregular terrain as possible.
2. Wildlife movement needs should be considered.
3. State and local laws may apply to boundary fences.
4. Consider livestock handling, watering and feeding requirements when locating fences
5. Consider soil erosion potential and feasibility of fence construction when planning fences on steep or irregular terrain.

Additional information including designs and construction specifications are available in the local NRCS Field Office Technical Guide.

The following page identifies the conservation effects expected to occur when this practice is applied. These effects are subjective and somewhat dependent on variables such as climate, terrain, soil, etc. Users are cautioned that these effects are estimates that may or may not apply to a specific site.

Fence Practice

Version 5.29.02



FILTER STRIP

PRACTICE INTRODUCTION

USDA, Natural Resources Conservation Service - practice code 393

FILTER STRIP
A filter strip is an area of vegetation established for the purpose of removing sediment, organic material, and other pollutants from runoff and waste water.

PRACTICE INFORMATION
Filter strips are generally located at the lower edge (s) of a field. This will vary somewhat with land use, topography and objectives.

A filter strip removes pollutants from runoff before the material enters a body of water. It also serves as a buffer between water and the fields above the water so that pesticides and other chemicals are not applied directly adjacent or into the water body.
Filter strips also reduce sedimentation of streams, lakes and other bodies of water.

Plant species selected for planting in a filter strip requires careful planning. There may be multiple objectives that can be accomplished by proper plant selection.

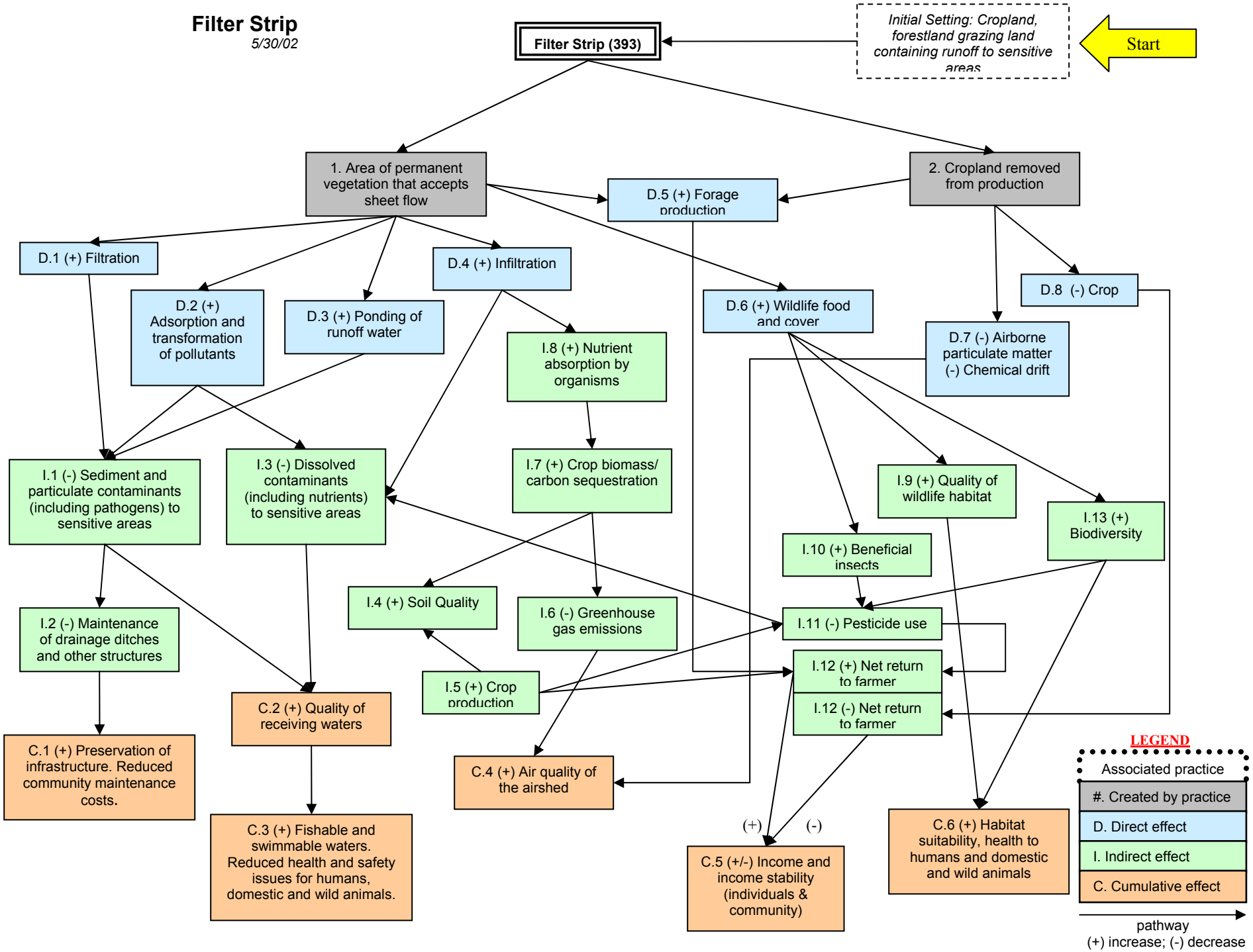
In addition to the above functions, filter strips can be designed to provide one or more of the following secondary benefits:
1. Improved fish and wildlife habitat.
2. Improved aesthetics
3. Improved equipment operations such as field access and turn rows or head lands.
4. Improved recreation opportunities.
5. Improved livestock forage source.

Specifications for design and installation of this practice are contained in the USDA/NRCS Field Office Technical Guide.

The following page identifies the conservation effects expected to occur when this practice is applied. These effects are subjective and somewhat dependent on variables such as climate, terrain, soil, etc. Users are cautioned that these effects are estimates that may or may not apply to a specific site.

Filter Strip

5/30/02



FOREST STAND IMPROVEMENT

PRACTICE INTRODUCTION

USDA, Natural Resources Conservation Service - practice code 666

FOREST STAND IMPROVEMENT
To manipulate species of trees by cutting or killing selected trees and understory vegetation.

PRACTICE INFORMATION
This practice applies to forest land where competing vegetation hinders development and stocking of preferred tree and understory species. The preferred species are identified and retained to achieve the intended purpose of improving the stand. Spacing, density and amounts of preferred plants are carefully planned. Consideration is given to the total ecosystem. Timing of treatment and retaining dead or dying trees will help minimize impacts on nesting birds and other wildlife. Food and cover for wildlife are further retained by minimal modifications of composition and spacing necessary to improve the vegetative cover considering the total natural resource base.

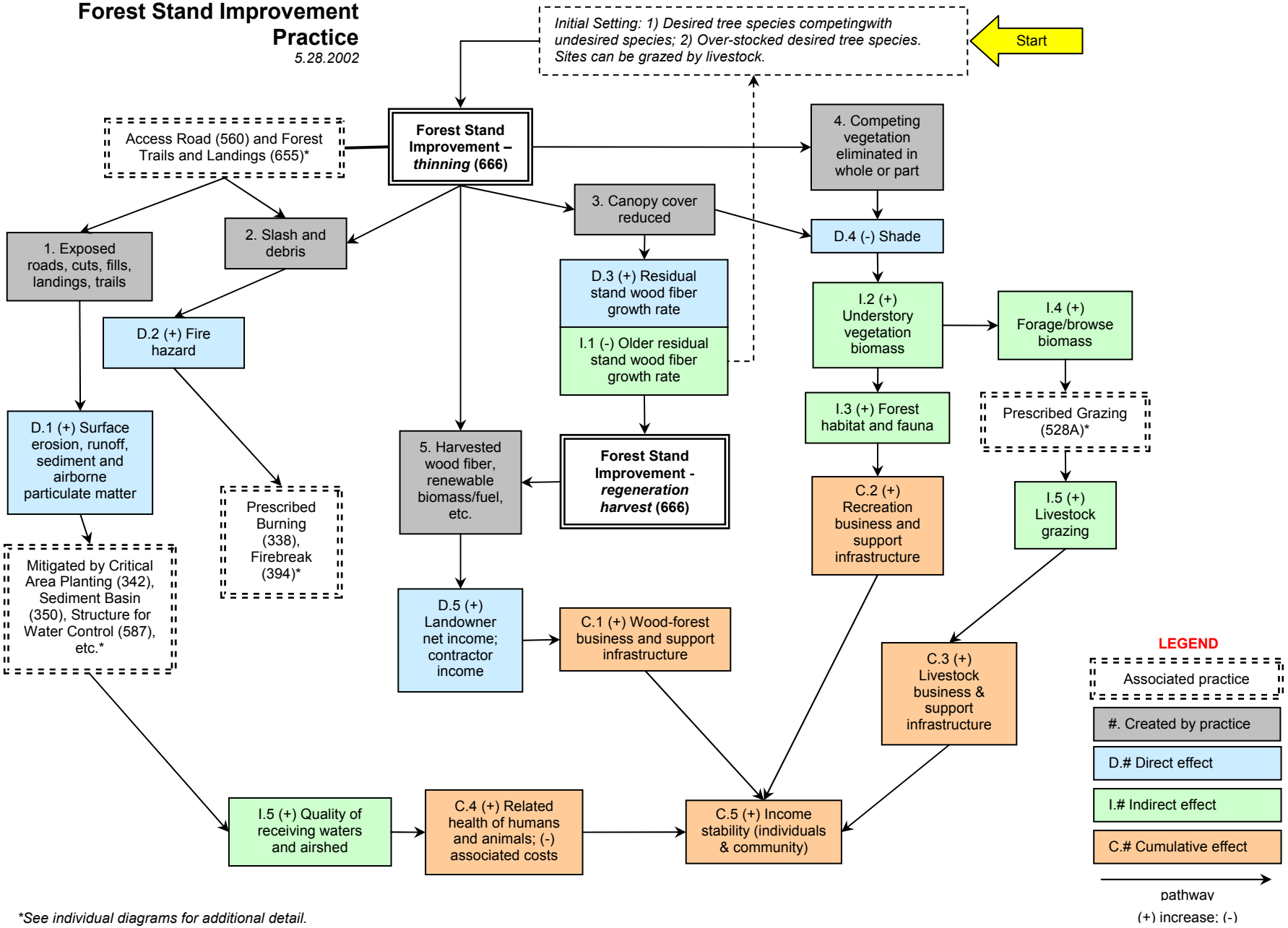
Purposes of this practice include the following:
1. Improve or sustain timber production
2. Improve understory forage production, aesthetics, wildlife habitat, recreation, and hydrologic condition.
3. To harvest forest products
4. To initiate sorest stand regeneration.
5. To achieve a combination of purposes

Additional information including standards and specifications for establishment and management of this practice are on file in the local NRCS Field Office Technical Guide.

The following page identifies the conservation effects expected to occur when this practice is applied. These effects are subjective and somewhat dependent on variables such as climate, terrain, soil, etc. Users are cautioned that these effects are estimates that may or may not apply to a specific site.

Forest Stand Improvement Practice

5.28.2002



**See individual diagrams for additional detail.*

GRASSED WATERWAY

PRACTICE INTRODUCTION

USDA, Natural Resources Conservation Service - practice code 412

GRASSED WATERWAY
A grassed waterway is a natural or constructed channel established in suitable vegetation for safe water disposal

PRACTICE INFORMATION
Waterways are constructed to convey runoff from terraces, diversions, or other concentrated flow areas where erosion control is needed.

The most critical time for successful installation of a grassed waterway is immediately following construction when the channel is bare and unprotected from runoff. Waterways are generally planted to perennial grass. It is critical during the vegetative establishment period to restrict outside water from flowing through the channel. Therefore, it may be necessary delay construction of terraces and/or diversions until the waterway is well established. Another critical consideration is the outlet at the lower end. If water quality or protection of riparian vegetation (streambank) is an issue, the outlet end may need to widen significantly or another buffer or filtering type practice may be necessary. In addition, the waterway installation must assure that the runoff from the waterway does not cause gullies and/or overfalls to develop.

Grassed waterways are multipurpose and provide one or more of the following benefits:

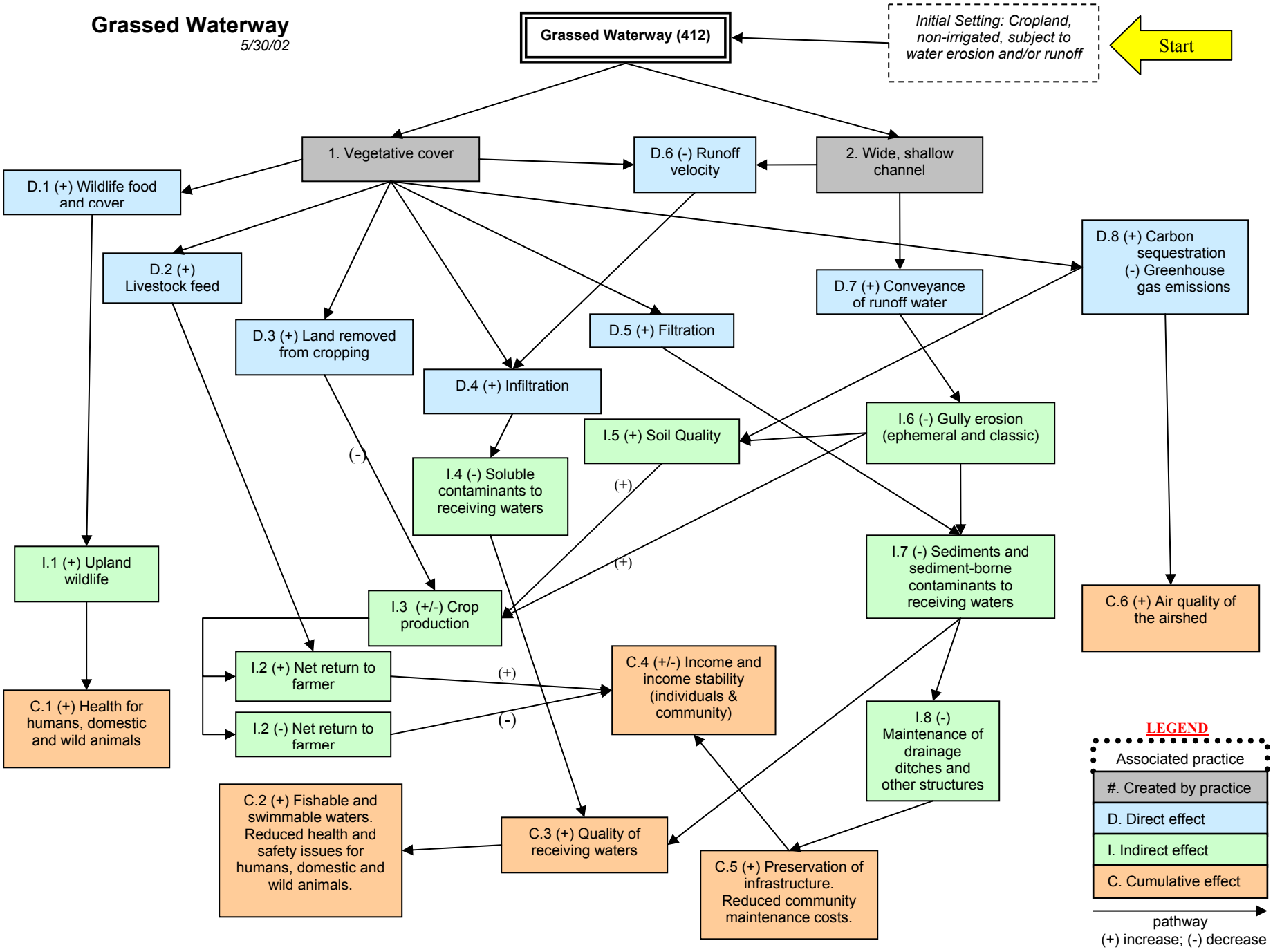
1. Safe disposal of runoff water
2. Erosion control is concentrated flow areas of a field
3. Improved water quality
4. Improved wildlife habitat
5. Reduced sediment damage
6. Improved landscape aesthetics

Additional information including standards and specifications are on file in the local NRCS Field Office Technical Guides.

The following page identifies the conservation effects expected to occur when this practice is applied. These effects are subjective and somewhat dependent on variables such as climate, terrain, soil, etc. Users are cautioned that these effects are estimates that may or may not apply to a specific site.

Grassed Waterway

5/30/02



IRRIGATION WATER MANAGEMENT

PRACTICE INTRODUCTION

USDA, Natural Resources Conservation Service - practice code 449

IRRIGATION WATER MANAGEMENT - Determining and controlling the rate, amount, and timing of irrigation water in a planned and efficient manner.

PRACTICE INFORMATION

The purpose of this practice is to effectively use available irrigation water in managing and controlling the moisture environment of crops and other vegetation. The objectives are to promote a desired response, minimize soil erosion, minimize loss of plant nutrients, and protect both the quantity and quality of water resources.

This practice is applicable to all areas that are suitable for irrigation and have a water supply of suitable quality and quantity. In addition, a suitable irrigation system must be available and the irrigator needs to have the knowledge and capability to manage irrigation water. The following knowledge is required to properly manage irrigation water:

1. How to determine when to apply water based on the rate of use by the crops at various stages of growth.
2. How to measure or estimate the amount of water required for each irrigation.
3. The time needed for the soil to absorb the required amount of water.
4. How to detect changes in intake rate.
5. How and when to adjust stream size, application rate, and irrigation time to compensate for changes in the soil or topography that effect intake rate.
6. How to recognize erosion caused by irrigation.
7. How to evaluate the uniformity of water application.

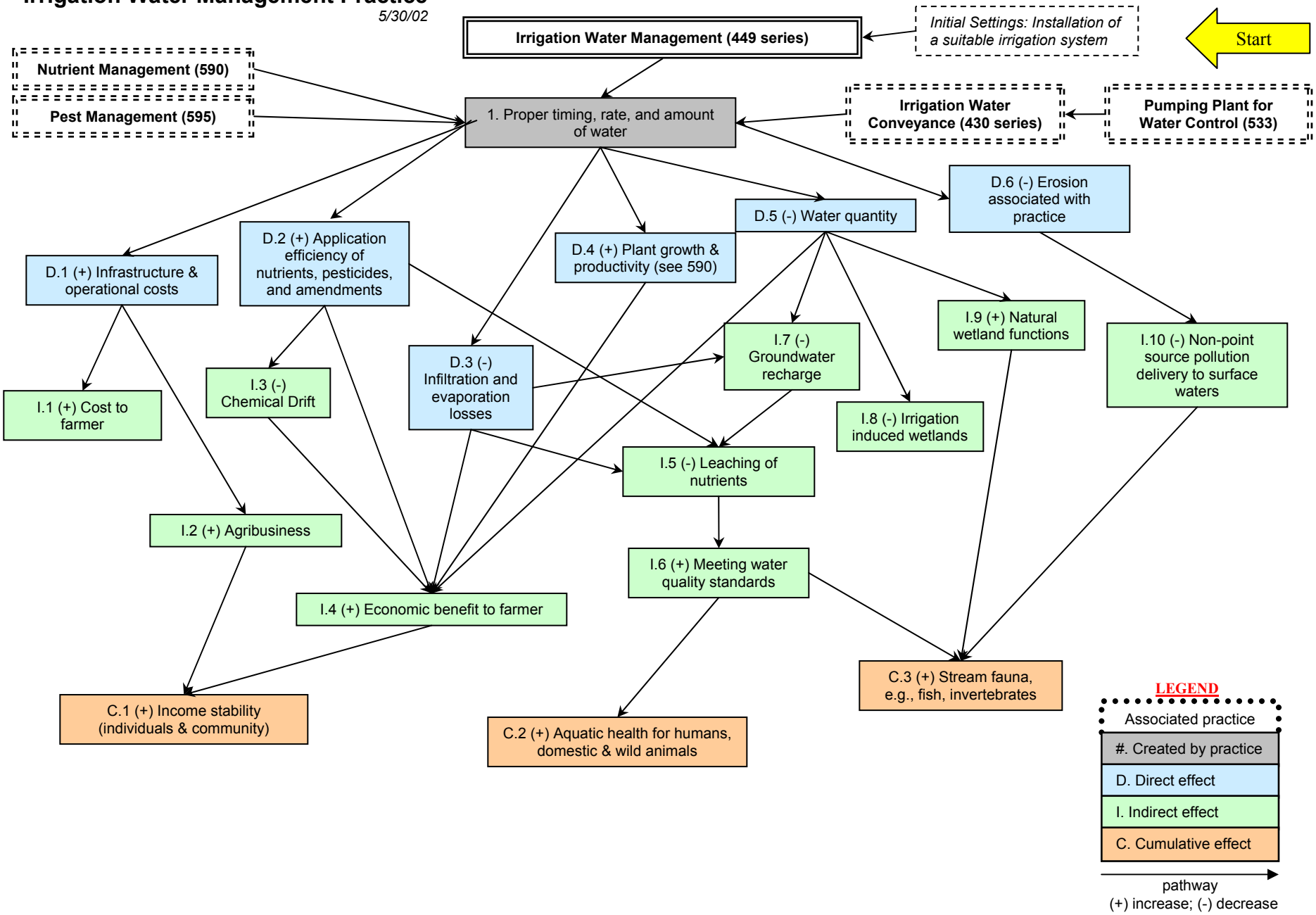
Evaluating the efficiency of applying irrigation water is expensive and time consuming. Therefore, the physical irrigation system and the technician's evaluation of the irrigators knowledge is acceptable in determining whether or not good irrigation water management is being practiced.

Additional information including standards and specifications are filed in the local NRCS Field Office Technical Guide.

The following pages contain the conservation effects expected to occur when this practice is applied. These effects are subjective and somewhat dependent on variables such as climate, terrain, soil, etc. Users are cautioned that these effects are estimates that may or may not apply to a specific site.

Irrigation Water Management Practice

5/30/02



NUTRIENT MANAGEMENT

PRACTICE INTRODUCTION

USDA, Natural Resources Conservation Service - practice code 590

NUTRIENT MANAGEMENT
This practice involves managing the amount, placement, and timing of plant nutrients to obtain optimum yields and minimize the risk of surface and groundwater pollution.

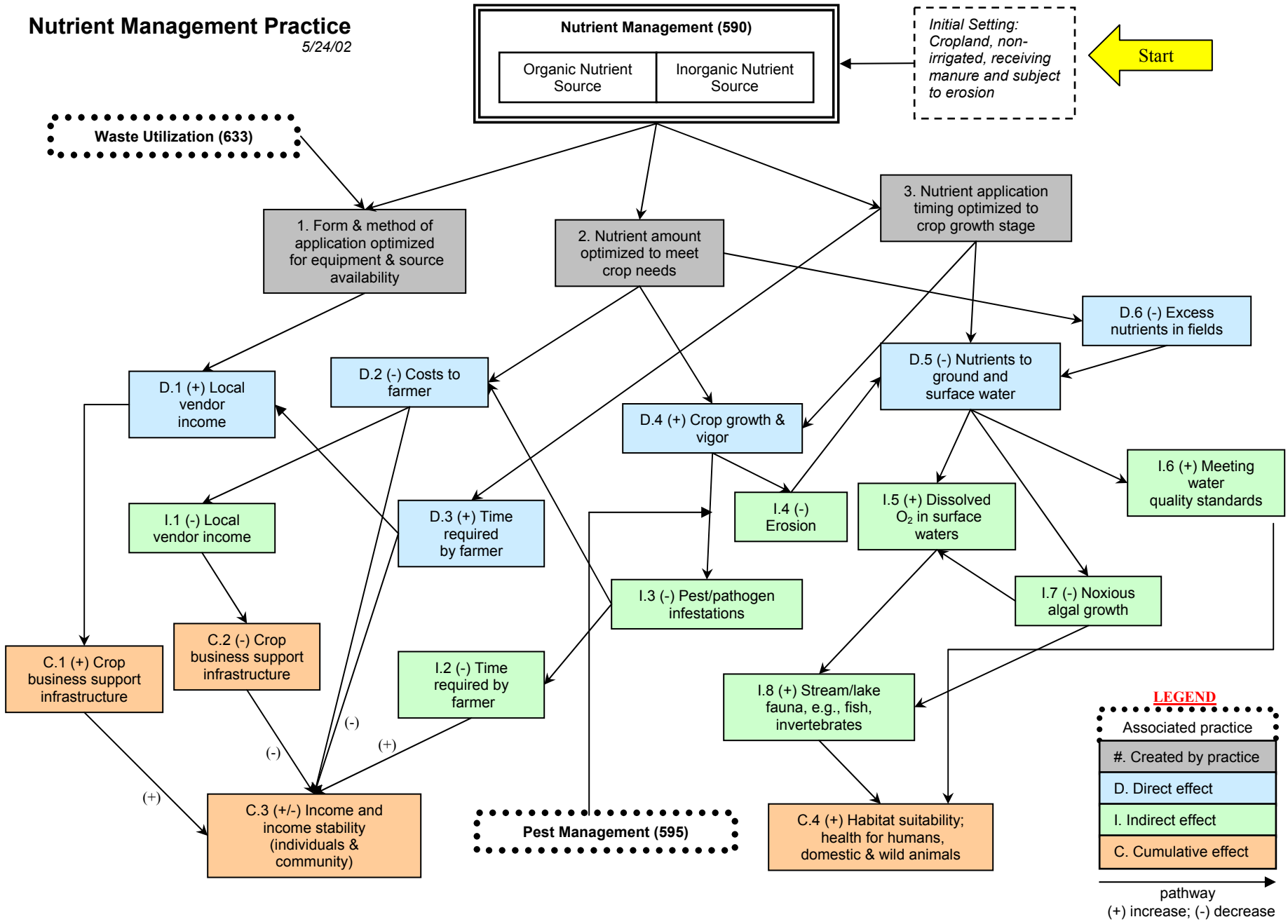
PRACTICE INFORMATION
Nutrient management may be used on any area of land where plant nutrients are applied to enhance yields and maintain or improve chemical and biological condition of the soil. The source of plant nutrients may be from organic wastes, commercial fertilizer, legumes, or crop residue. The objective is to apply the proper amount of nutrients at the proper time to achieve the desired yield and minimize entry of nutrients into surface or groundwater supplies.

Planning Nutrient Management involves the following considerations:

1. National, state and local water quality standards.
2. Sources and forms of plant nutrients available to the farmer.
3. Amounts and timing of nutrients based on soil testing, planned yield and growing season of target plants.
4. Evaluate use of crop rotations that enhance efficiency of nutrient utilization and improve soil tilth.
5. Consider waste storage requirements and land area requirements for proper management of plant nutrients.
6. Others.

Additional information including standards and specifications are filed in the local NRCS Field Office Technical Guide.

The following page identifies the conservation effects expected to occur when this practice is applied. These effects are subjective and somewhat dependent on variables such as climate, terrain, soil, etc. Users are cautioned that these effects are estimates that may or may not apply to a specific site.


Nutrient Management Practice
5/24/02
Nutrient Management (590)
Organic Nutrient Source
Inorganic Nutrient Source
Initial Setting: Cropland, non-irrigated, receiving manure and subject to erosion
Start
Waste Utilization (633)
1. Form & method of application optimized for equipment & source availability
2. Nutrient amount optimized to meet crop needs
3. Nutrient application timing optimized to crop growth stage
D.6 (-) Excess nutrients in fields
D.5 (-) Nutrients to ground and surface water
D.4 (+) Crop growth & vigor
D.2 (-) Costs to farmer
D.1 (+) Local vendor income
D.3 (+) Time required by farmer
I.1 (-) Local vendor income
I.4 (-) Erosion
I.5 (+) Dissolved O_2 in surface waters
I.6 (+) Meeting water quality standards
I.3 (-) Pest/pathogen infestations
I.7 (-) Noxious algal growth
I.2 (-) Time required by farmer
I.8 (+) Stream/lake fauna, e.g., fish, invertebrates
C.1 (+) Crop business support infrastructure
C.2 (-) Crop business support infrastructure
C.3 (+/-) Income and income stability (individuals & community)
C.4 (+) Habitat suitability; health for humans, domestic & wild animals
Pest Management (595)
(-)
(-)
(+)
(+)
LEGEND
Associated practice
#. Created by practice
D. Direct effect
I. Indirect effect
C. Cumulative effect
pathway
(+) increase; (-) decrease

PEST MANAGEMENT

PRACTICE INTRODUCTION

USDA, Natural Resources Conservation Service - practice code 595

PEST MANAGEMENT
Utilizing environmentally sensitive prevention, avoidance, monitoring and suppression strategies, to manage weeds, insects, diseases, animals and other organisms (including invasive and non-invasive species), that directly or indirectly cause damage or annoyance.

PRACTICE INFORMATION
This practice establishes the minimum acceptable elements of a pest management program. It includes appropriate cultural, biological, and chemical controls, and combinations thereof.

The purpose of the practice is to establish a pest management program that is consistent with crop production goals and environmental concerns.

The following are major considerations regarding the pest management practice:

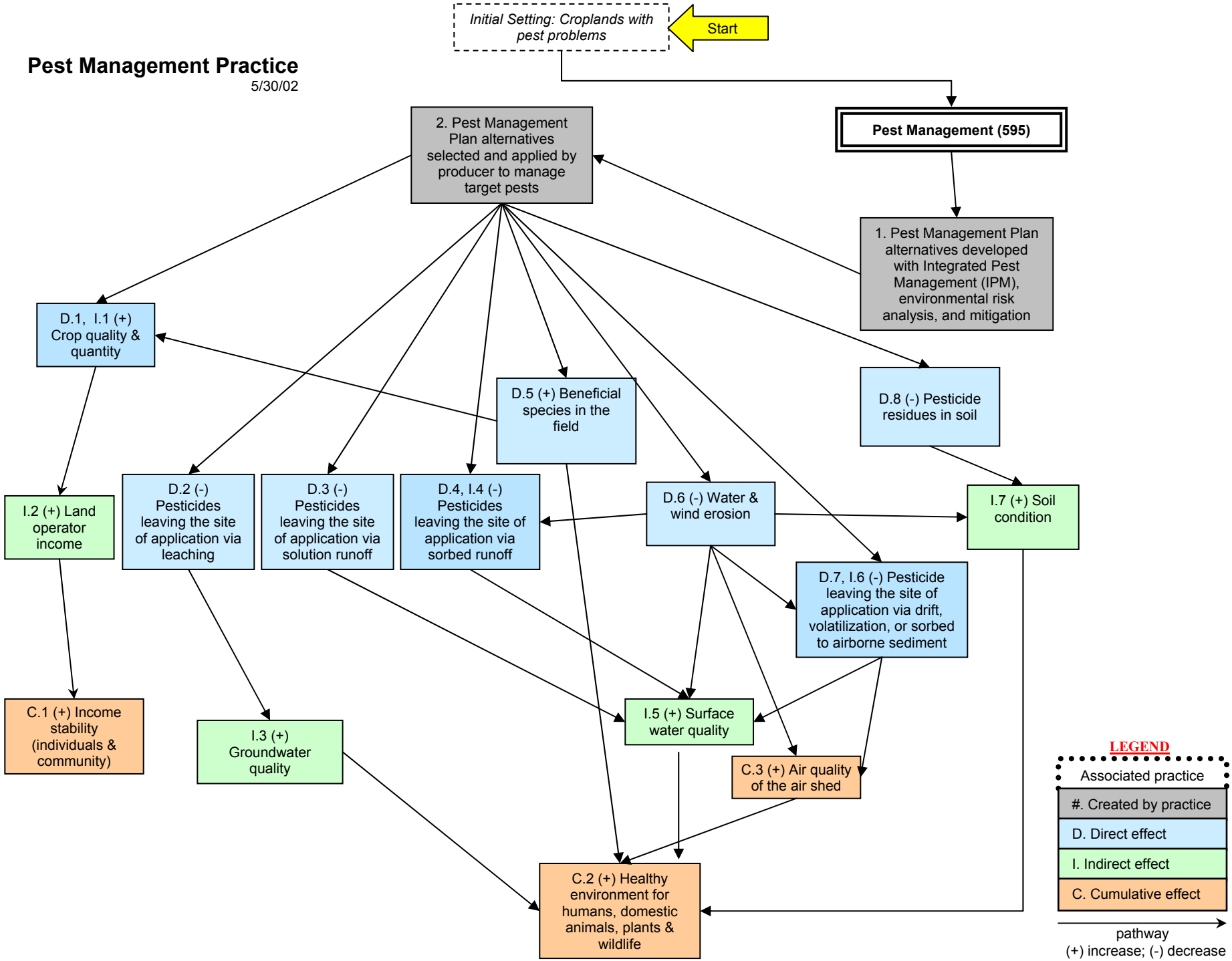
1. Use integrated pest management principles to assure the techniques a environmentally sound.
2. Use crop rotations to break up pest cycles
3. Use hand weeding or spot treatment when appropriate
4. Use biological control and beneficial insects
5. Scout fields and apply chemicals at the correct time and dose rate
6. Consider the effects of repetitive use of the same chemicals on pesticide resistance
7. Control erosion to reduce runoff and associated pollution
8. Use field borders and buffer strips to reduce potential for pollution from runoff
9. Become familiar with common pests including life cycles and learn alternative control techniques
10. Use chemicals safely
11. Always follow label instructions
12. Use extreme care in preparing tank mixes and rinsing chemicals from tanks
13. Assure farm workers are properly trained in safety precautions

Additional information including standards and specifications are included in the local NRCS Field Office Technical Guide.

The following page identifies the conservation effects expected to occur when this practice is applied. These effects are subjective and somewhat dependent on variables such as climate, terrain, soil, etc. Users are cautioned that these effects are estimates that may or may not apply to a specific site.

Pest Management Practice

5/30/02



PIPELINE

PRACTICE INTRODUCTION

USDA, Natural Resources Conservation Service - practice code 516

PIPELINE
The NRCS pipeline practice is used when a pipeline is needed to convey water for livestock, recreation or wildlife.

PRACTICE INFORMATION
The purpose of this practice is simply to convey water from the source of supply to the point (s) of use. The objective is usually to decentralize the location of drinking or water storage facilities. The practice is applicable where water needs to be piped to another location (s) for management purposes, to conserve the supply, or for reasons of sanitation.

Pipelines installed under this practice are generally for livestock management purposes. A single water source can provide livestock water to several locations and be very effective in improving management of a grazing unit.

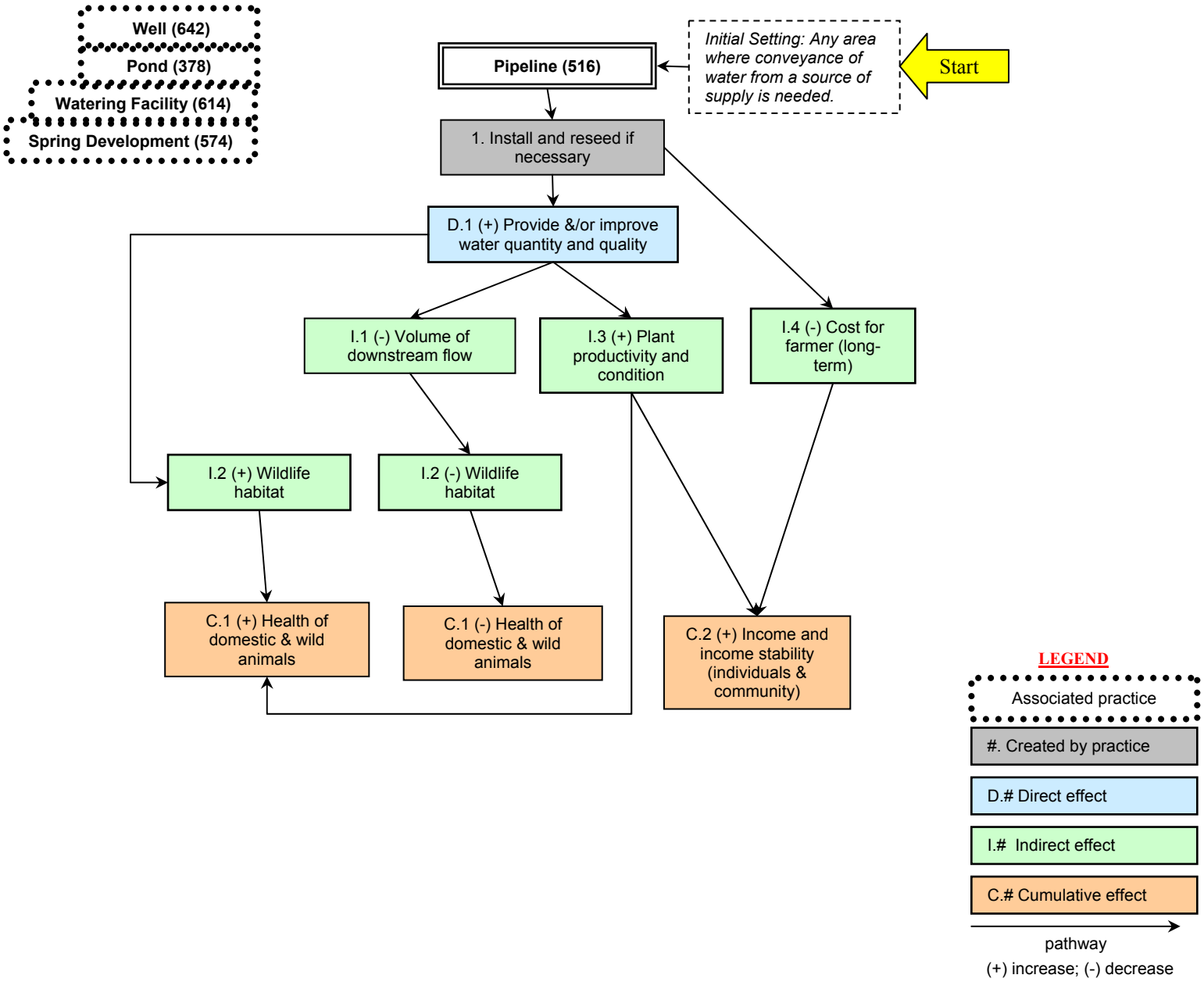
Pipelines are also used on recreation and wildlife lands to provide or distribute drinking water facilities for humans as well as wildlife.

Additional information including design criteria and specifications are in the local NRCS Field Office Technical Guide.

The following page identifies the conservation effects expected to occur when this practice is applied. These effects are subjective and somewhat dependent on variables such as climate, terrain, and soil. Users are cautioned that these effects are estimates that may or may not apply to a specific site.

Pipeline Practice

Version 5.29.02



RANGE PLANTING

PRACTICE INTRODUCTION

USDA, Natural Resources Conservation Service - practice code 550

RANGE PLANTING
Range planting is establishment of adapted perennial vegetation.

PRACTICE INFORMATION
This practice applies to rangeland, native or naturalized pasture, grazed forest or other suitable land areas where the principle method of vegetation management is grazing.

Vegetation types might be grasses, legumes, shrubs, forbs, shrubs and trees.

The practice applies where desirable vegetation is below the acceptable level for natural reseeding to occur, or where the potential for enhancement of the vegetation by grazing management is unsatisfactory.

Species, cultivars or varieties selected must be compatible with management objectives and adapted to climatic conditions, soil, landscape position, and range site. In addition, the selected species for planting must provide adequate cover for erosion control. Plants selected for establishment should also contribute to wildlife and aesthetics when opportunities exist and are in line with planning objectives.

Plant establishment requires the following:
1. Proper seedbed preparation
2. Observe recommended planting dates
3. Plant at the recommended rate or spacing
4. Use quality seed and plant material
5. Apply recommended soil amendments and fertilizer
6. Control weeds and grazing during establishment period

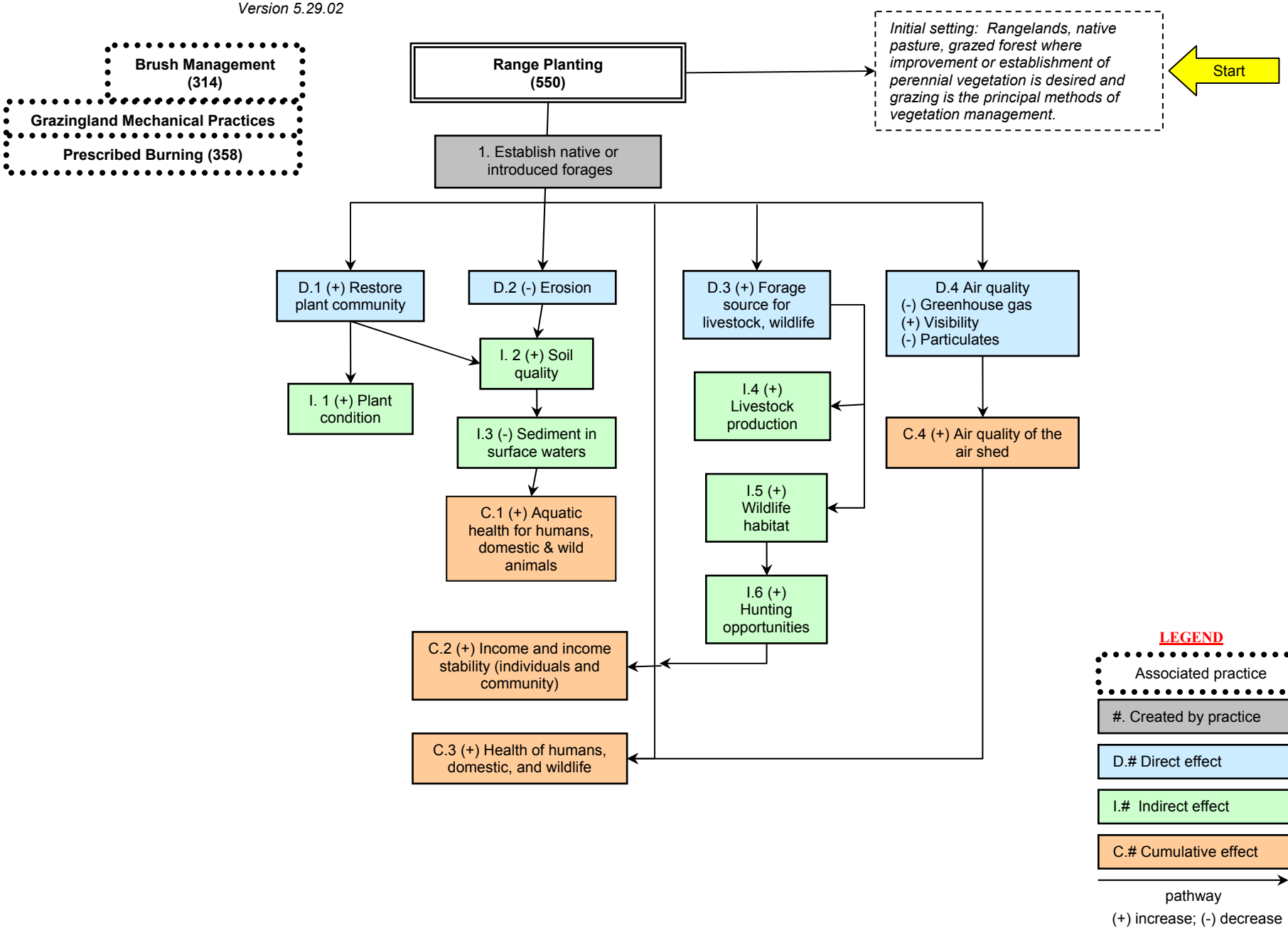
Other conservation practices such as Brush Management, and Grazing Land Mechanical Treatment may be needed to promote establishment and management of a successful range planting.

Additional information including practice specifications can be obtained from your local NRCS field office or USDA service center.

The following page identifies the conservation effects expected to occur when this practice is applied. These effects are subjective and somewhat dependent on variables such as climate, terrain, soil, etc. Users are cautioned that these effects are estimates that may or may not apply to a specific site.

Range Planting Practice

Version 5.29.02



RESIDUE MANAGEMENT, MULCH-TILL

PRACTICE INTRODUCTION

USDA, Natural Resources Conservation Service - practice code 329B

RESIDUE MANAGEMENT, MULCH TILL - This practice is managing crop residue on a year round basis to provide an acceptable erosion rate, conserve moisture and maintain or improve soil tilth.

PRACTICE INFORMATION

This practice generally applies to cropland but may also be used on other areas where field crops are grown such as wildlife or recreation lands.

Mulch tillage is a term used when referring to non-inversion tillage such as chiseling and disk harrowing to partially incorporate organic material left on the soil surface. Mulch tillage includes at least the following:

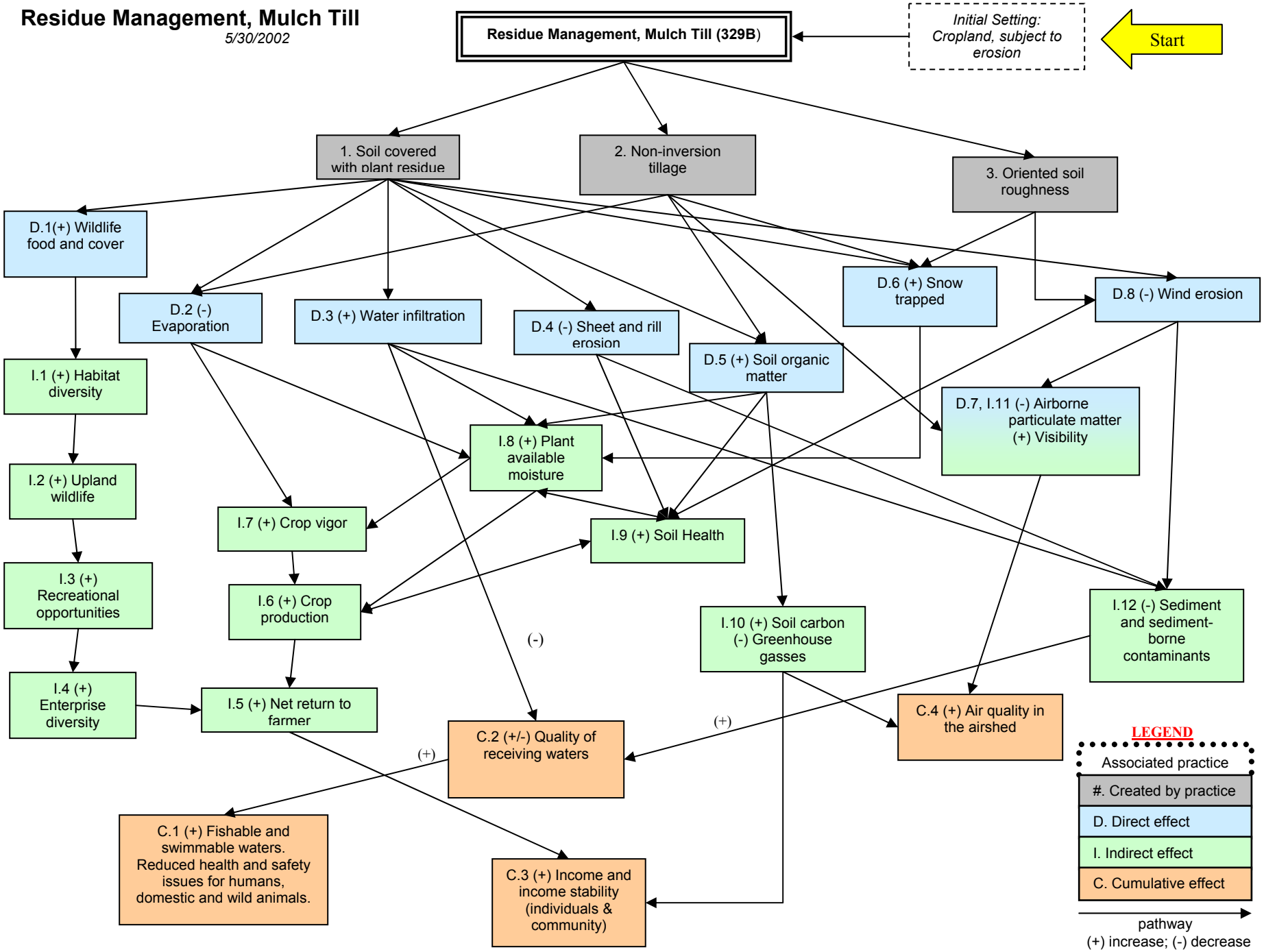
1. Uniformly spreading the residue on the soil surface to accommodate planting the following crop.
2. Use non-inversion tillage tools that only partially incorporate surface organic material.
3. Plan the number, sequence, and timing of tillage operations to achieve the prescribed amount of surface residue needed to accomplish the objectives of the practice.
4. Use planting equipment designed to operate in high residue situations.
5. Minimize removal of organic residue by burning, baling or grazing.
6. Additional criteria are provided in the practice standard and specifications contained in the NRCS Field Office Technical Guide.

The benefits of this practice are significant. Soil slowly but steadily improves when erosion is reduced and organic matter increases. Soil tilth improves and productivity increases as the constant supply of organic material left on the soil surface is decomposed by a healthy population of earth worms and other organisms.

The following page identifies the conservation effects expected to occur when this practice is applied. These effects are subjective and somewhat dependent on variables such as climate, terrain, soil, etc. Users are cautioned that these effects are estimates that may or may not apply to a specific site.

Residue Management, Mulch Till

5/30/2002



RESIDUE MANAGEMENT, NO-TILL AND STRIP TILL

PRACTICE INTRODUCTION

USDA, Natural Resources Conservation Service - practice code 329A

RESIDUE MANAGEMENT, NO-TILL AND STRIP-TILL

This practice is managing the amount, orientation and distribution of crop and other plant residue on the soil surface year-round. Crops are planted and grown in narrow slots or tilled strips established in the untilled seedbed of the previous crop.

PRACTICE INFORMATION

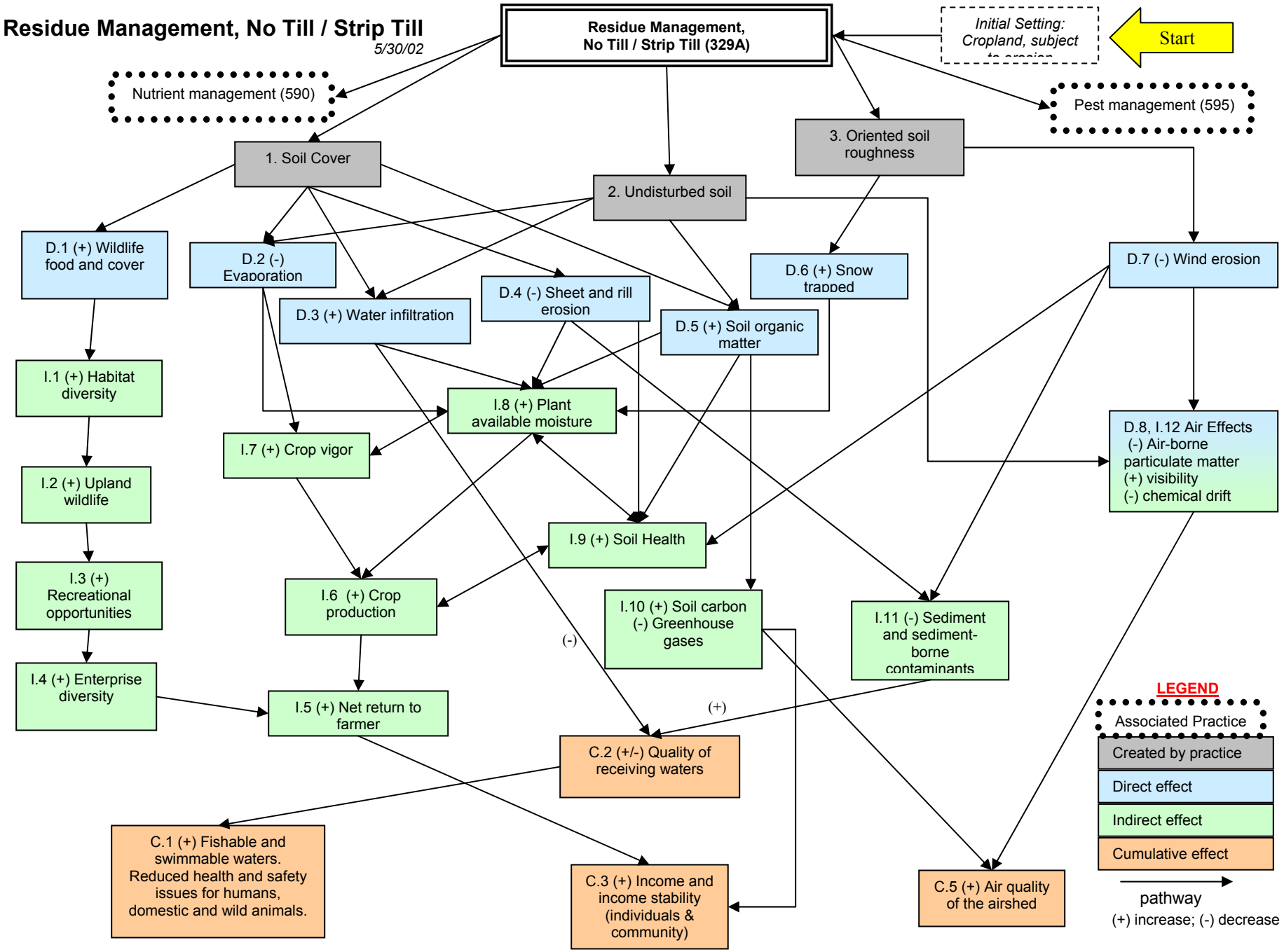
The objective of this practice is to maintain most of the crop residue on the soil surface throughout the year. The practice may be referred to as no-till, zero-till, slot plant, row-till, strip-till or just the generic term conservation tillage. The common characteristic of this practice is that the only tillage performed is a very narrow strip prepared by coulters, sweeps, or similar devices attached to the front of the planter.

Weeds and other pests are generally managed by using agriculture chemicals. The chemicals used are approximately the same as those used with a tillage based system, but a "no-till" residue management system requires a higher level of technology and management than a more conventional tillage system. The fields must be scouted on a regular basis and the farm operator must be very familiar with the pests and understand the concept of threshold populations and other Integrated Pest Management technologies.

The benefits of this practice are significant. Erosion is usually reduced to an acceptable level due to the protective residue left on the surface.

Soil organic matter increases and soil organisms such as earth worms increase progressively. The soil tilth improves, and productivity increases as the constant supply of organic material left on the surface is decomposed by a healthy population of soil organisms.

The following page identifies the conservation effects expected to occur when this practice is applied. These effects are subjective and somewhat dependent on variables such as climate, terrain, soil, etc. Users are cautioned that these effects are estimates that may or may not apply to a specific site.


Residue Management, No Till / Strip Till
5/30/02
Residue Management, No Till / Strip Till (329A)
Initial Setting: Cropland, subject to erosion
Start
Nutrient management (590)
Pest management (595)
1. Soil Cover
2. Undisturbed soil
3. Oriented soil roughness
D.1 (+) Wildlife food and cover
D.2 (-) Evaporation
D.3 (+) Water infiltration
D.4 (-) Sheet and rill erosion
D.5 (+) Soil organic matter
D.6 (+) Snow trapped
D.7 (-) Wind erosion
I.1 (+) Habitat diversity
I.2 (+) Upland wildlife
I.3 (+) Recreational opportunities
I.4 (+) Enterprise diversity
I.5 (+) Net return to farmer
I.6 (+) Crop production
I.7 (+) Crop vigor
I.8 (+) Plant available moisture
I.9 (+) Soil Health
I.10 (+) Soil carbon (-) Greenhouse gases
I.11 (-) Sediment and sediment-borne contaminants
D.8, I.12 Air Effects (-) Air-borne particulate matter (+) visibility (-) chemical drift
(-)
(+)
C.1 (+) Fishable and swimmable waters. Reduced health and safety issues for humans, domestic and wild animals.
C.2 (+/-) Quality of receiving waters
C.3 (+) Income and income stability (individuals & community)
C.5 (+) Air quality of the airshed
LEGEND
Associated Practice
Created by practice
Direct effect
Indirect effect
Cumulative effect
pathway
(+) increase; (-) decrease

RESIDUE MANAGEMENT, RIDGE-TILL

PRACTICE INTRODUCTION

USDA, Natural Resources Conservation Service - practice code 329C

RESIDUE MANAGEMENT, RIDGE TILL - This practice is managing crop residue on a year round basis and growing crops on ridges alternated with furrows protected by crop residue.

PRACTICE INFORMATION
This practice generally applies to cropland but may also be used on other areas where field crops are grown such as wildlife or recreation lands.

Growing crops on pre-formed ridges covered with crop residue requires specialized equipment for both cultivation and planting. At crop lay-by, or last cultivation, a disk cultivator reforms the ridges for the next crop. After harvest, the crop residue is left on the soil surface until the following crop is planted. The ridge planter is equipped with a tool to clear a narrow path on the ridge top to accommodate planting the seed.

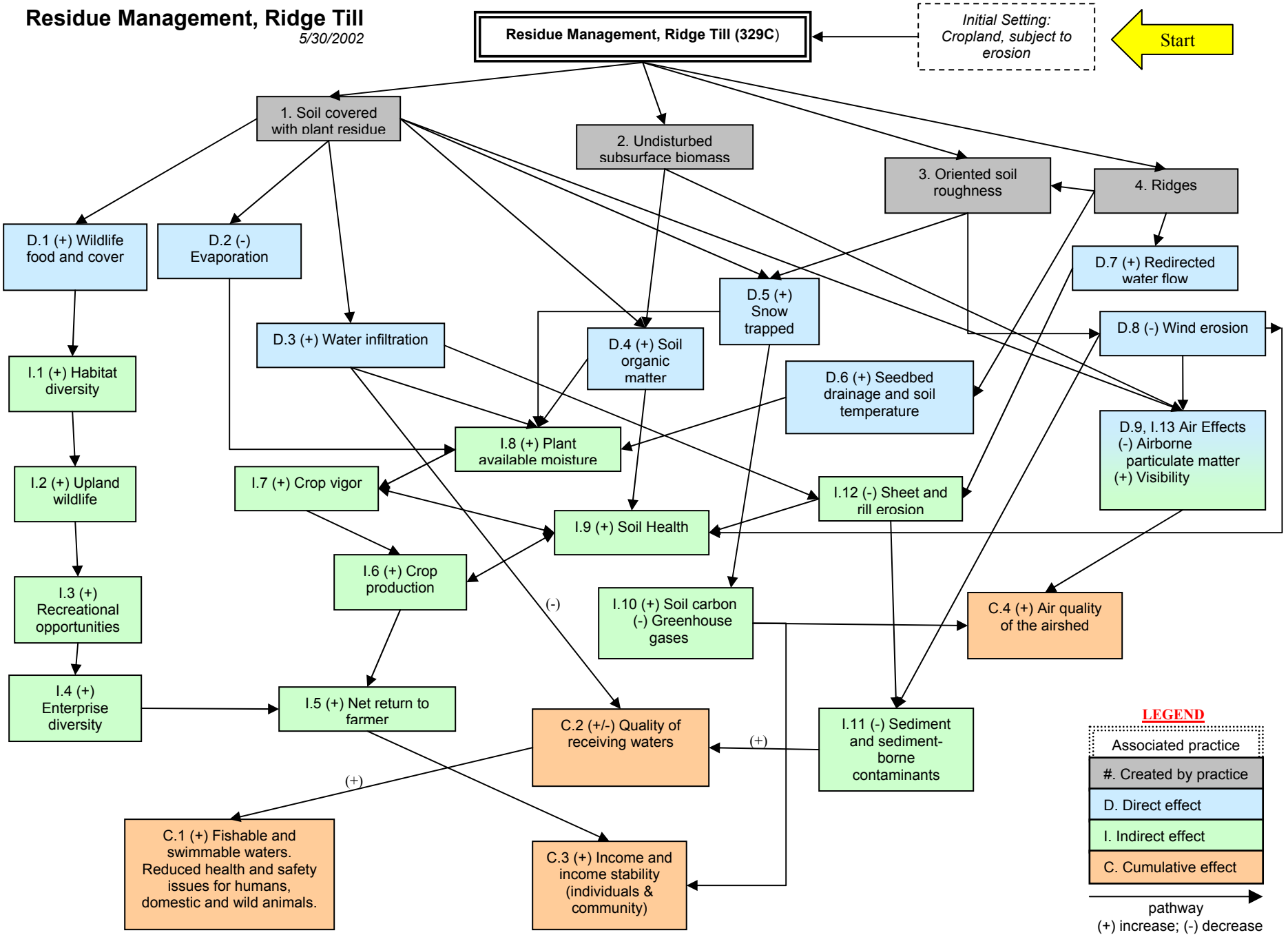
The benefits of ridge-till are significant. Soil slowly but steadily improves when erosion is reduced and organic matter increases. Soil tilth improves and productivity increases as the constant supply of organic material left on the soil surface is converted to humus by a healthy population of earth worms and other soil organisms. The surface residue plus the ridges and furrows provide excellent food and cover for wildlife.

Additional information including standards and specifications are filed in the local NRCS Field Office Technical Guide.

The following page identifies the conservation effects expected to occur when this practice is applied. These effects are subjective and somewhat dependent on variables such as climate, terrain, soil, etc. Users are cautioned that these effects are estimates that may or may not apply to a specific site.

Residue Management, Ridge Till

5/30/2002



RESIDUE MANAGEMENT, SEASONAL

PRACTICE INTRODUCTION

USDA, Natural Resources Conservation Service - practice code 344

RESIDUE MANAGEMENT, SEASONAL - This practice is managing to leave protective amounts of crop residue on the soils surface during a prescribed time of the year, by delaying primary tillage or seedbed preparation until immediately prior to planting time.

PRACTICE INFORMATION

This practice generally applies to cropland but may also be used on other areas where field crops are grown such as wildlife or recreation lands. The practice only applies to crops that produce sufficient amounts of residue to protect the soil from erosion.

Erosion can be significantly reduced by this practice in locations where delaying seedbed preparation allows residue to be left on the soil surface during critical periods for protection from wind and water erosion. Crops grown using this tillage system are generally planted in a relatively clean seedbed.

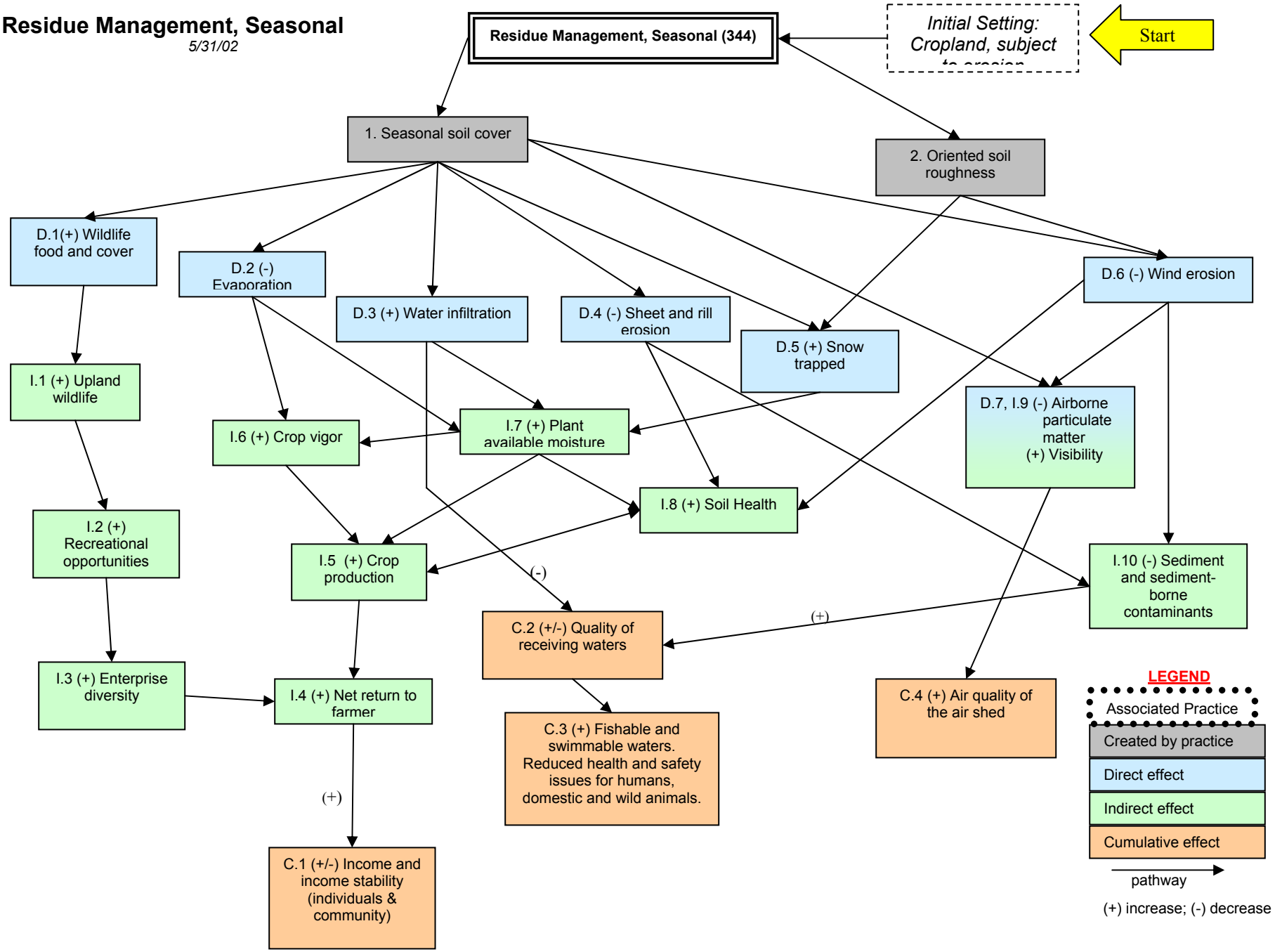
Excessive removal of plant residue by burning, baling, or grazing often produces negative impacts on the natural resources. These activities should not be performed without evaluating the impacts.

Additional information including standards and specifications for this practice are available in the local NRCS Field Office Technical Guide.

The following page identifies the conservation effects expected to occur when this practice is applied. These effects are subjective and somewhat dependent on variables such as climate, terrain, soil, etc. Users are cautioned that these effects are estimates that may or may not apply to a specific site.

Residue Management, Seasonal

5/31/02



RIPARIAN FOREST BUFFER

PRACTICE INTRODUCTION

USDA, Natural Resources Conservation Service - practice code 391

RIPARIAN FOREST BUFFER

A riparian forest buffer is an area of trees and/or shrubs located adjacent to a body of water. The vegetation extends outward from the water body for a specified distance necessary to provide a minimum level of protection and/or enhancement.

PRACTICE INFORMATION

This practice applies to areas adjacent to permanent or intermittent streams, lakes, ponds, wetlands and areas associated with ground water recharge.

The riparian forest buffer is a multi-purpose practice design to accomplish one or more of the following:

1. Create shade to lower water temperatures and improve habitat for aquatic animals.
2. Provide a source of debris necessary for healthy robust populations of aquatic organisms and wildlife.
3. Act as a buffer to filter out sediment, organic material, fertilizer, pesticides and other pollutants that may adversely impact the water body, including shallow ground water.

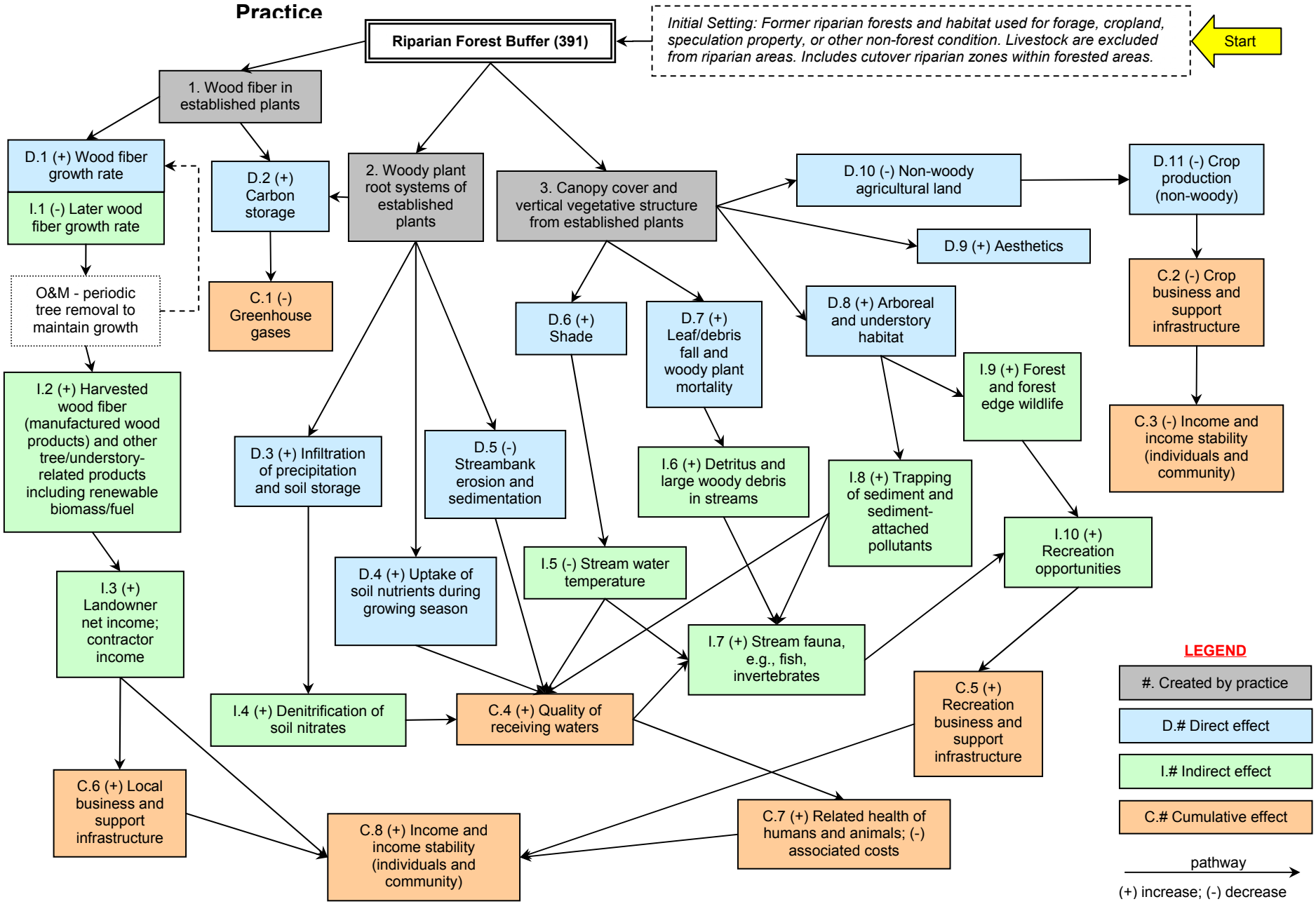
Dominant vegetation consists of existing or planted trees and shrubs suited to the site and purpose (s) of the practice. Grasses and forbs that come in naturally further enhance the wildlife habitat and filtering effect of the practice.

Headcuts and streambank erosion should be assessed and treated appropriately before establishing the riparian forest buffer.

Specifications for each installation are based on a thorough field investigation of each site.

The following page identifies the conservation effects expected to occur when this practice is applied. These effects are subjective and somewhat dependent on variables such as climate, terrain, soil, etc. Users are cautioned that these effects are estimates that may or may not apply to a specific site.

Riparian Forest Buffer Practice



ROOF RUNOFF STRUCTURE

PRACTICE INTRODUCTION

USDA, Natural Resources Conservation Service - practice code 558

ROOF RUNOFF STRUCTURE
Roof runoff structure is a facility for collecting, controlling, and disposing of runoff water from roofs.

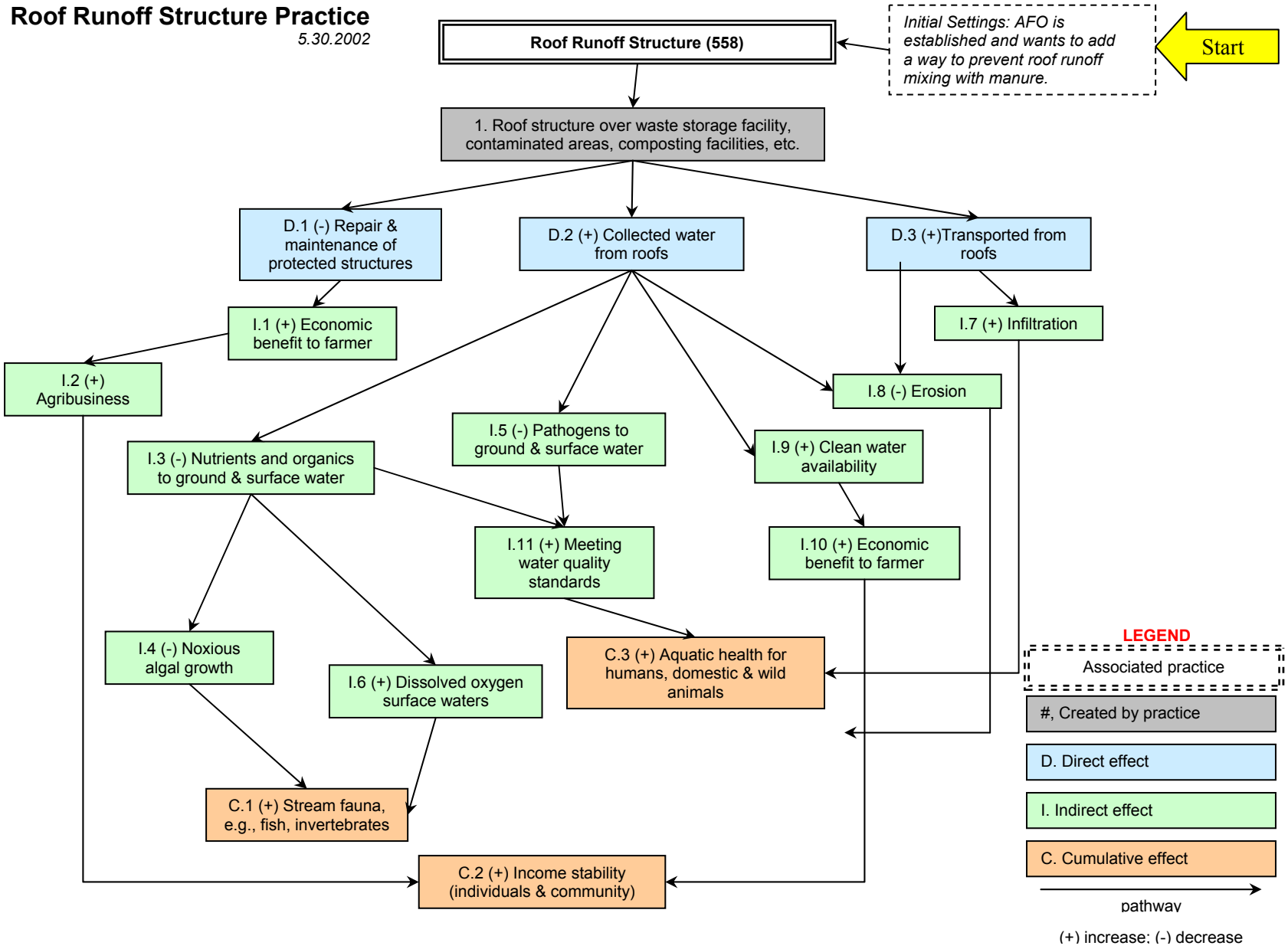
PRACTICE INFORMATION
The purpose of this practice is to prevent roof runoff water from flowing across concentrated waste areas, barnyards, roads, and alleys. The practice reduces pollution, flooding, and erosion. It also improves water quality, drainage, and the overall efficiency of a waste management system. The water from roof runoff can be stored and reused for cleaning and other purposes. The practice also reduces the volume requirements of lagoons and waste storage facilities, and reduces the volume of effluent water requiring treatment or land application.

Additional information including design criteria and specifications for installing roof runoff structure facilities are filed in the local NRCS Field Office Technical Guide.

The following page identifies the conservation effects expected to occur when this practice is applied. These effects are subjective and somewhat dependent on variables such as climate, terrain, soil, etc. Users are cautioned that these effects are estimates that may or may not apply to a specific site.

Roof Runoff Structure Practice

5.30.2002



UPLAND WILDLIFE HABITAT MANAGEMENT

PRACTICE INTRODUCTION

USDA, Natural Resources Conservation Service - practice code 645

DEFINITION

Upland Wildlife Habitat Management is creating, maintaining, or enhancing areas of food and cover for upland wildlife.

PRACTICE INFORMATION

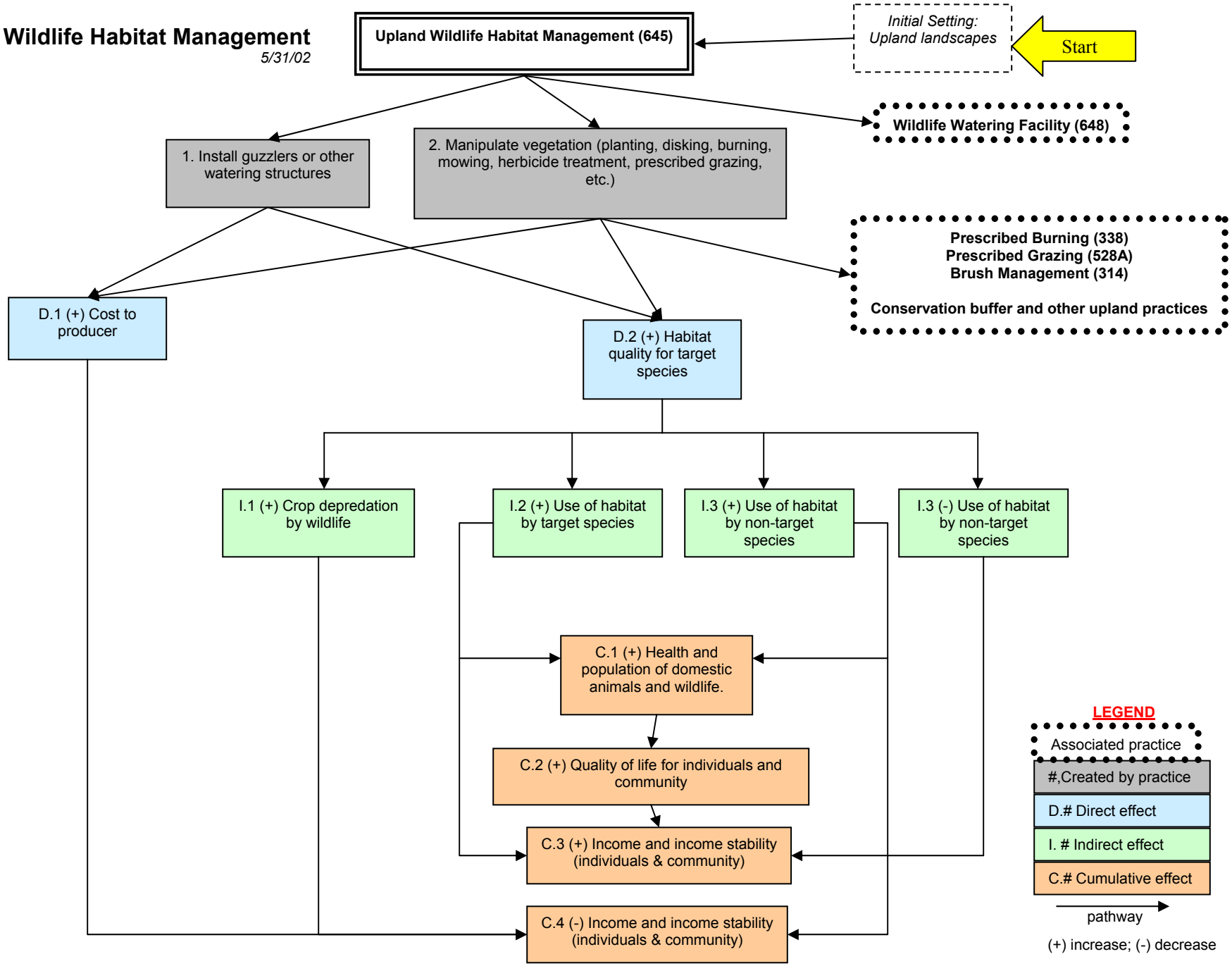
The population dynamics of wildlife is highly dependent on food, water, and cover. The purpose of this practice is to enhance the wildlife habitat and maintain or increase populations of wildlife species. The practice applies to all areas where wildlife need improvements in food, cover, and management.

Additional information including design criteria and specifications are in the local NRCS Field Office Technical Guide.

The following page identifies the conservation effects expected to occur when this practice is applied. These effects are subjective and somewhat dependent on variables such as climate, terrain, and soil. Users are cautioned that these effects are estimates that may or may not apply to a specific site.

Upland Wildlife Habitat Management

5/31/02



WETLAND WILDLIFE HABITAT MANAGEMENT

PRACTICE INTRODUCTION

USDA, Natural Resources Conservation Service - practice code 644

DEFINITION
Wetland wildlife habitat management is retaining, creating, or managing wetland habitat for wildlife.

PRACTICE INFORMATION
This practice is used to create or improve habitat for waterfowl, furbearers, or other wildlife. It applies on wetland and other areas where water can be impounded or regulated by diking, ditching, or flooding.

The practice is planned for specific species of wildlife. Specifications for the practice include items such as:

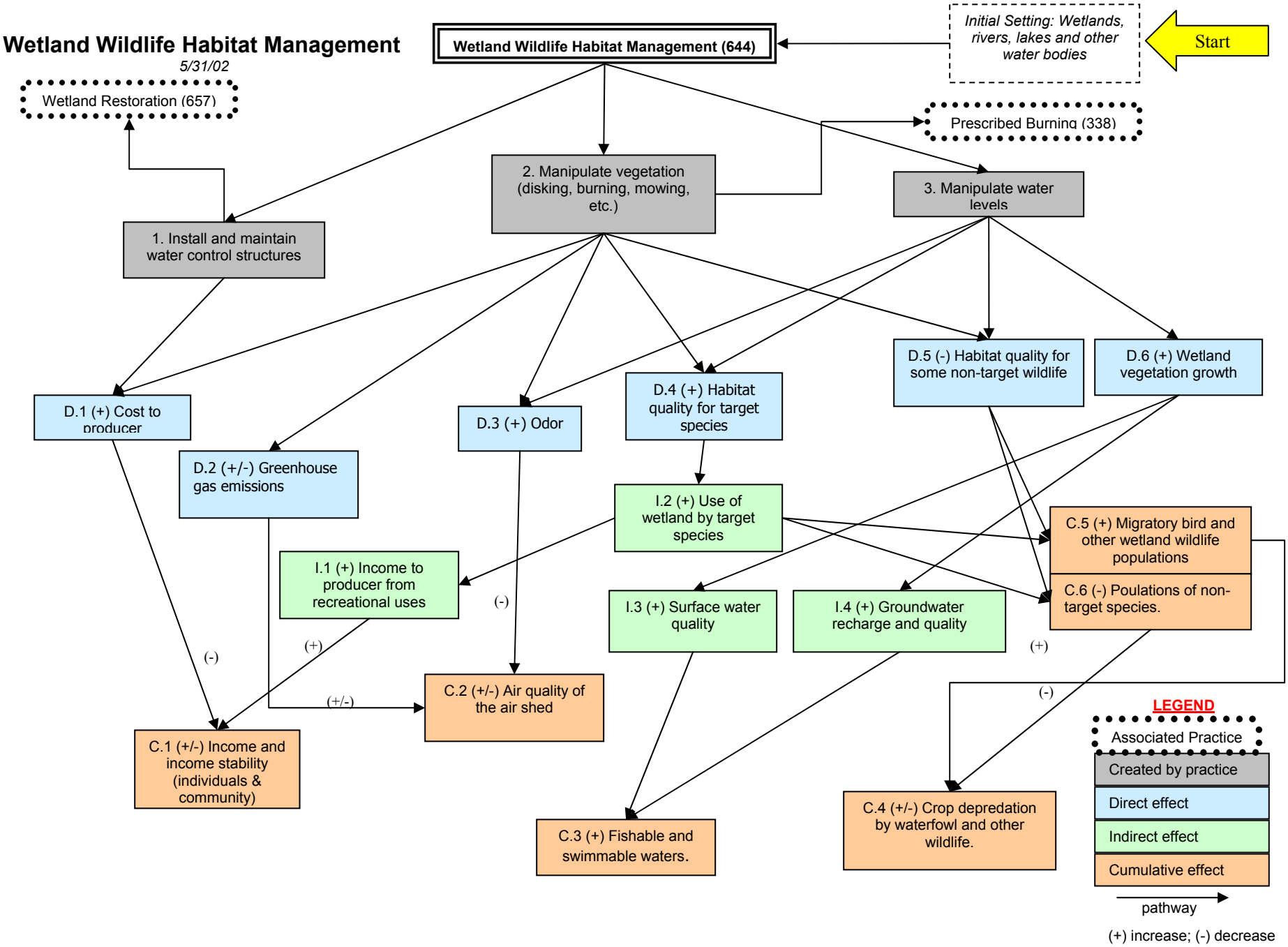
- Practice components, including structures, necessary to meet the requirements of the desired species of wildlife.
- The required seasonal water depths necessary to provide adequate habitat during different seasons of the year
- Adapted plant species required for reproduction, food and cover by target species of wildlife
- Management of vegetation to assure sustainability

Additional information including design criteria and specifications are in the local NRCS Field Office Technical Guide.

The following page identifies the conservation effects expected to occur when this practice is applied. These effects are subjective and somewhat dependent on variables such as climate, terrain, soil, etc. Users are cautioned that these effects are estimates that may or may not apply to a specific site.

Wetland Wildlife Habitat Management

5/31/02



WINDBREAK/SHELTERBELT ESTABLISHMENT

PRACTICE INTRODUCTION

USDA, Natural Resources Conservation Service - practice code 380

WINDBREAK/SHELTERBELT ESTABLISHMENT

Windbreaks and shelterbelts are single or multiple rows of trees or shrubs planted for environmental purposes.

PRACTICE INFORMATION

This practice can be used in any area where woody plants are suited. The specie, location, layout, and density of the planting depends on the purpose and planned function of the practice.

In areas where natural precipitation is too low for establishment of suitable woody species, moisture conservation or supplemental irrigation should be planned.

The effectiveness of a windbreak or shelterbelt is dependent on the height of the mature plants. Therefore, this is a long term proposition that may take 20 years to become fully functional.

This is a multipurpose practice that will serve one or more of the following functions:

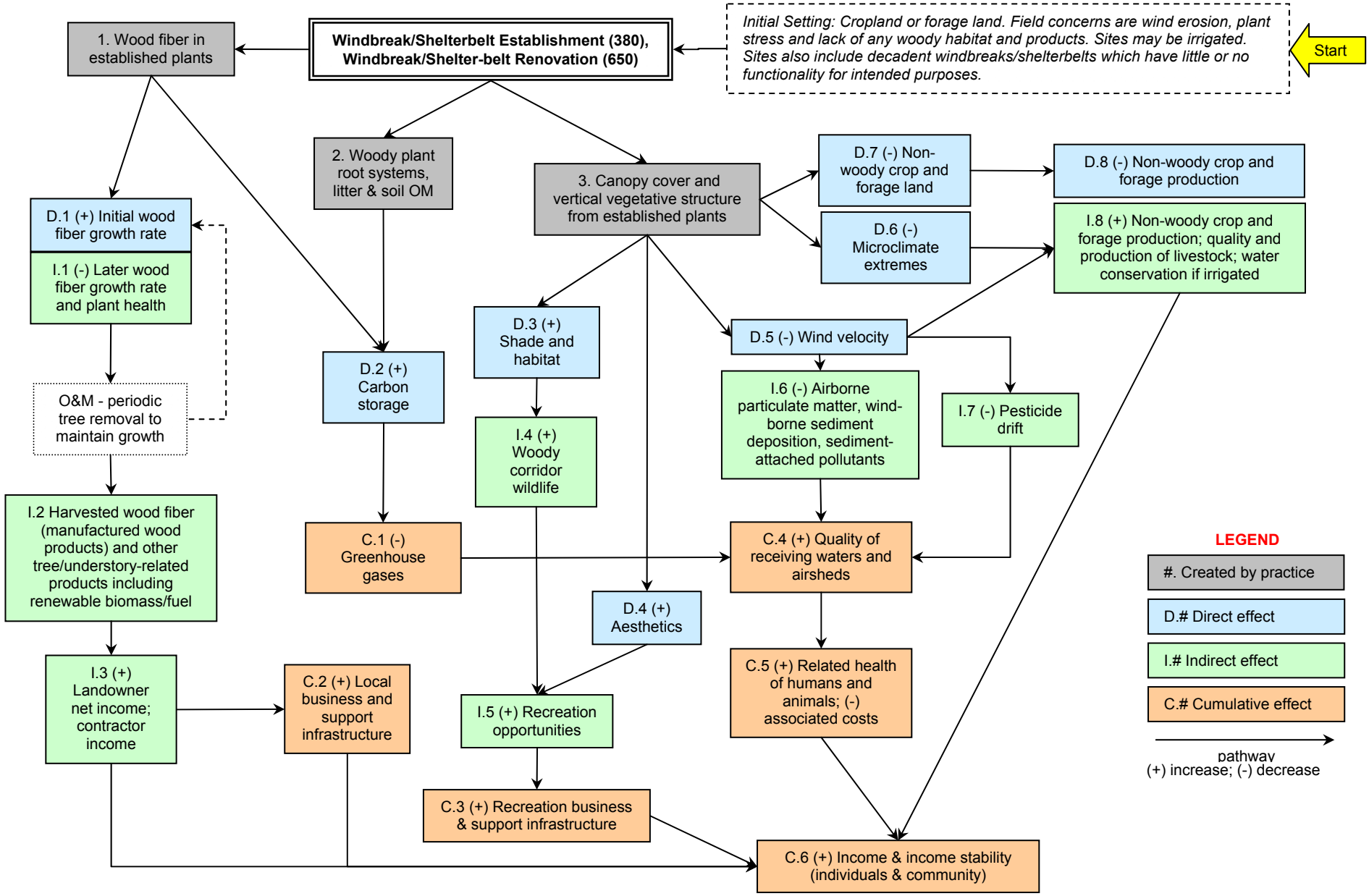
1. Reduce wind erosion
2. Protect growing plants
3. Manage snow
4. Provide shelter for structures and livestock
5. Provide wildlife food and cover
6. Provide tree or shrub products
7. Provide living screens
8. Improve aesthetics
9. Improve moisture use efficiency

Additional information including standards and specifications for this practice are available in the NRCS Field Office Technical Guide.

The following page identifies the conservation effects expected to occur when this practice is applied. These effects are subjective and somewhat dependent on variables such as climate, terrain, soil, etc. Users are cautioned that these effects are estimates that may or may not apply to a specific site.

Windbreak/Shelterbelt Establishment and Renovation Practices

5.28.2002



WASTE STORAGE FACILITY

PRACTICE INTRODUCTION

USDA, Natural Resources Conservation Service - practice code 313

DEFINITION
A waste storage facility is a waste impoundment made by constructing an embankment, excavating a pit or dugout, or by fabricating a structure.

PRACTICE INFORMATION
A waste storage facility is a component of a complete agricultural waste management system. The purpose of the practice is to provide temporary storage of waste material generated by production and/or processing of agricultural products. The waste material may be animal manure, wastewater, or contaminated runoff.

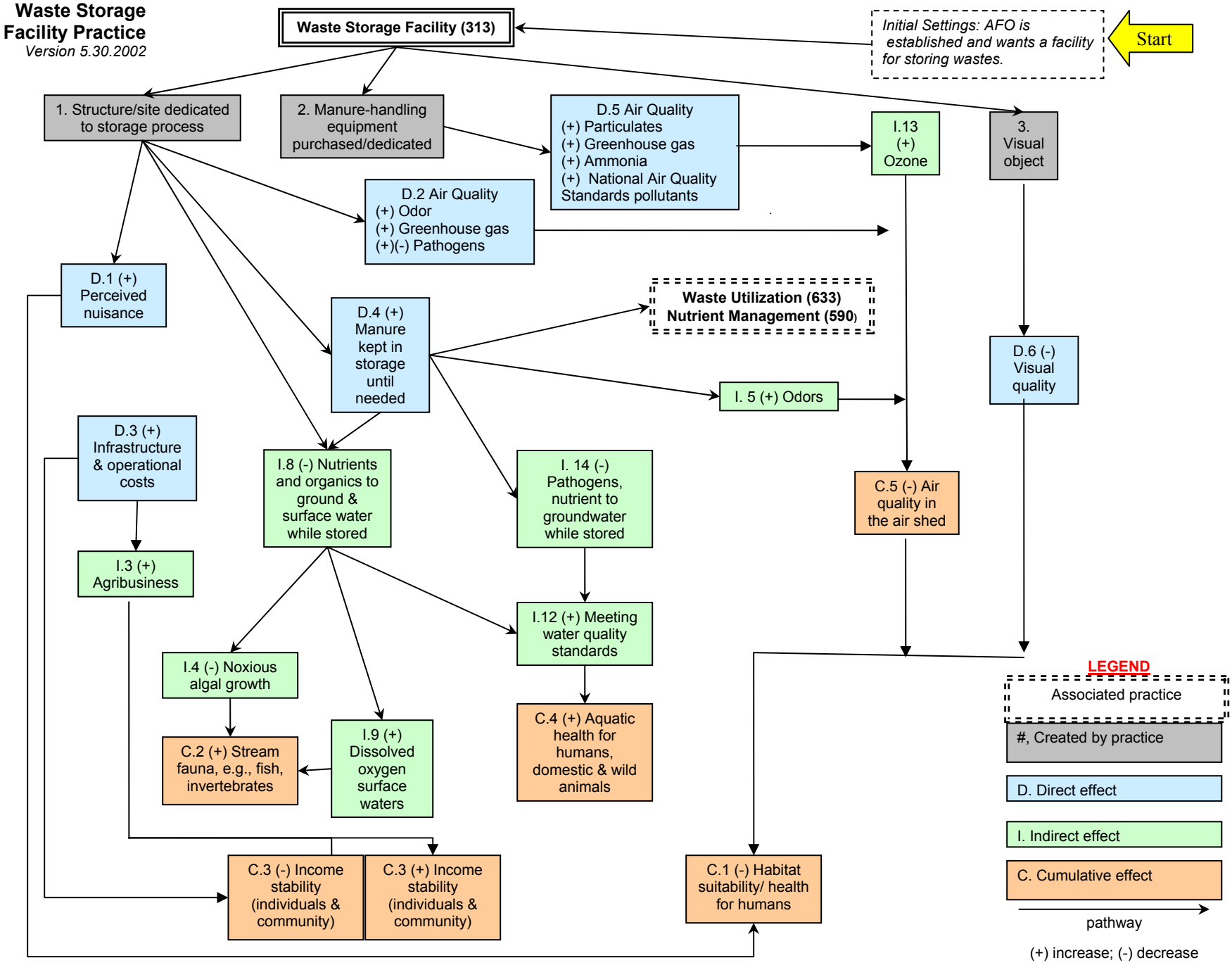
An operation and maintenance plan is developed to specify requirements for emptying the storage facility. The plan specifies timing, rates, and volume of waste applications. For ponds, the plan also includes requirements for timely removal of waste material to accommodate subsequent storms.

Design criteria for this practice includes:

- Site location
- Design storage volume
- Storage period
- Inlet structures
- Safety features
- Pond criteria
- Emptying facilities
- Fabricated structure criteria

Additional information including detailed design criteria and specifications is in the local NRCS Field Office Technical Guide.

The following page identifies the conservation effects expected to occur when this practice is applied. These effects are subjective and somewhat dependent on variables such as climate, terrain, soil, etc. Users are cautioned that these effects are estimates that may or may not apply to a specific site.


Waste Storage Facility Practice
Version 5.30.2002
Waste Storage Facility (313)
Initial Settings: AFO is established and wants a facility for storing wastes.
Start
1. Structure/site dedicated to storage process
2. Manure-handling equipment purchased/dedicated
D.5 Air Quality
(+) Particulates
(+) Greenhouse gas
(+) Ammonia
(+) National Air Quality Standards pollutants
I.13 (+) Ozone
3. Visual object
D.2 Air Quality
(+) Odor
(+) Greenhouse gas
(+)(-) Pathogens
D.1 (+) Perceived nuisance
D.4 (+) Manure kept in storage until needed
Waste Utilization (633)
Nutrient Management (590)
D.6 (-) Visual quality
I. 5 (+) Odors
D.3 (+) Infrastructure & operational costs
I.8 (-) Nutrients and organics to ground & surface water while stored
I. 14 (-) Pathogens, nutrient to groundwater while stored
C.5 (-) Air quality in the air shed
I.3 (+) Agribusiness
I.12 (+) Meeting water quality standards
I.4 (-) Noxious algal growth
C.4 (+) Aquatic health for humans, domestic & wild animals
C.2 (+) Stream fauna, e.g., fish, invertebrates
I.9 (+) Dissolved oxygen surface waters
C.3 (-) Income stability (individuals & community)
C.3 (+) Income stability (individuals & community)
C.1 (-) Habitat suitability/ health for humans
LEGEND
Associated practice
#, Created by practice
D. Direct effect
I. Indirect effect
C. Cumulative effect
pathway
(+) increase; (-) decrease